

TROPICAL DISEASES BULLETIN

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ERRATA.

Vol. 26 No. 6 p. 504 Summary of Kusama's paper line 2, par 4 for China read Japan.	
Vol. 26 No. 11 p. 896 Summary of Welch's paper lines 4 & 5. Read on second and third days 1 drachm (castor oil) hourly not 1 oz.	

TROPICAL DISEASES
BULLETIN.

Vol 201

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MALARIA

SI AGAR (1 Miken) Malaria in Barbados. Report and Commem-
 Jt J of Soc of Spain Med Soc 1927 pp 1-18 W 524 -

So if it returns to the question of malaria in Barbados, men and money are forthcoming there will be a case. It has been told that a house should be placed on (Dona) as advised by James seemingly based on the experience of *Anopheles maculipennis* in England. (-) on question of the difference in conditions and the proved importance of quinine as an exterminator of infection. The reason why attack anophelae in the house comes from the League of Nations Commission and no doubt Colonel James was largely in the instigation of a scheme which makes the defence of a matter of personal interest to every housewife. So far as that every possible means must be used which tends to malaria in Barbados.

Clifton Lyne

Stevens (F. A.) *Malaria in Barbados*, (Unpublished)
 Dept Med & Hyg 1928, May 1 Vol 11 No 9 p 112.

ALLANSTON, Fort Health Officer of Barbadoes, being of opinion that anophelines had always been present in Barbadoes, but checked by the S. & G. points out that Low failed to find them in 1901. The entomologist has equally failed during seventeen years more. When S. & G. himself made his first malarial survey in November 1925 all breeding was in temporary pools, the nearest water to the shore at low moonings. Two or three months later a second visit showed the appearance of permanent water and breeding going on right across the island. Had Ratnoff's suggestion of trap pools much more years ago been accepted this amazing epidemic would have been prevented.

C L

— 1927 Aug Vol 3 No 2 pp 61-70 Studies of the Malaria Problem in Porto Rico, Summary of Studies on Incidence Paper VII

The local incidence of malaria is described as having a history of a spleen index of 12.8 and a parasite index of 21 (19 were 11.7 to 13.9 and 10 were 20.34).

drainage is a most difficult matter with an annual rainfall of 63 in. [and there seems no evidence that it would be antimalarially successful] and that reclamation of land and increase of population without deliberate antilarval work have already brought down malarial incidence to a low figure in certain riverside areas. A tract of land south of Calcutta is selected as the most suitable for the city's extension.

C. L.

STRICKLAND (C.) assisted by CROWDERY (K. L.) & in collaboration with DODDS-PRICE (J.) FORSYTH (C. E. P.) SMITH (Hugh) MURPHY (R. A.) & WILLIAMS (D. P.) *Abridged Report on Malaria in the Assam Tea Gardens with Pictures, Tables and Charts.*—128 pp. With 26 figs. & 3 plates. [26 refs.]

This well illustrated report, written for the Indian Tea Association, has a sting resulting evidently from obstruction by persons some of whom at least from the context seem to be medical. The investigation, carried out with striking completeness, originated in a suggestion by McCombie YOUNG taken up by Col. MEGAW of the Calcutta School of Tropical Medicine and the Indian Tea Association. Matters of wide interest are that season does not appreciably influence the spleen or haemoglobin indices, but does affect the parasite index. Anopheles are markedly seasonal as follows. Winter—*gigas fuliginosus hyrcanus* (=sinensis) and less so *maculatus*. Spring—*maculatus culicifacies*, *gigas* and less so *barbirostris*. rains—*barbirostris kochi tessellatus* and less so *hyrcanus* and *gigas* and probably *umbrosus*. Autumn—*umbrosus hyrcanus* and less so *kochi tessellatus fuliginosus maculatus* and *gigas*. Malaria case incidence is greatest in September or October. The spleen index in garden born and immigrant children very shortly become the same. The recommendations stress the importance of site selection and the ridiculous situation which has arisen because of neglect to consult an expert. It points out the localness of malaria.

We do not subscribe to the view of the mugwumps that one can do nothing on an estate if neighbours will not co-operate. It urges the vital necessity of species sanitation and of working out from a centre. Finally, with an amusing but scarcely fair cynicism one of the Report's conclusions is that the reason for the neglect of such matters "lies in the fact that Sir Ronald Ross made his great discovery here."

C. L.

COVELL (G.) *Malaria in Bombay 1928.*—pp. v+113. With 4 maps & 1 chart. 1928. Bombay Govt. Central Press. [Re 1 As 8 cr 2s. 6d.]

It is impossible to give an adequate abstract of this publication and of the thorough work which underlies it. The spleen and parasite rates of Bombay are extremely patchy, the latter being as low as 5 and as high as 49 in different parts. Here malaria is carried by *A. stephensi*; it is exclusively man-made, this mosquito breeding only in cisterns, tanks, fountains and wells. The closing of wells, screening of cisterns and treating of mill-ponds with Paris green are essential for eradication. The problem can be solved only by placing the whole area under a whole time special Malaria Officer of the Municipality by legislation which gives him adequate powers and by his ability to carry with him the officers of the various local bodies, Government Departments,

Railways Mills as well as the Municipality itself Without this co-operation no antimalarial scheme in Bombay can possibly succeed. As to the future comment must insist as indeed Covell does that had BENTLEY's proposals of 17 years ago been properly carried out malaria would not be for Bombay the grave and increasing handicap which in fact it is.

C L

SARCAR (Sarasi Lal) **Flood and Flush Schemes—Ancient and Modern—with Reference to the Site of the Ancient City of Gour Malda District, Bengal, and to the Incidence of Malaria.**—*Indian Med Gaz* 1927 Apr Vol. 62 No 4 pp 188-195 With 1 plan.

The ancient city of Gour had Sarcar believes a system of flood and flush the failure of which caused its extermination by malaria The proposal was to restore this but there was strong opposition by big landholders who have planted profitable mango orchards on the higher lands

But in 1922 the people of the locality being educated by propaganda work to save themselves from death and destruction by the ravages of such epidemic diseases as malaria and kala-azar stealthily cut the Lohagora bundh during the night There was thereby a flow of flood water through a portion of the non flooded area within the bundhs This appeared to have a marked effect in improving the health of the locality The cut portion of the bundh was not subsequently closed owing to strong public opinion and probably also because the landholders and zemindars who were in opposition found that they suffered no financial loss

The results of spleen census before and after are tabulated

C L

COVELL (G) **Report of an Inquiry into Malarial Conditions in the Andamans.**—28 pp With 2 maps 1927 Delhi Govt of India Press

The outstanding feature of malaria in the Andamans is its extreme localization all old-established villages situated half a-mile or more from salt swamps are healthy often with a spleen rate of 0 those situated close to these are highly malarious with a spleen rate up to 50 The essential carrier is *A. ludlowi* breeding in these swamps Covell fully confirms CHRISTOPHERS' conclusions and advice given in 1911 Where the latter has been followed and sites moved there has been striking success where it has been neglected disaster It is estimated that of the negrito aborigines in the Great Andaman only 120 survive the few examined had a high spleen rate

C L

BOREL (M) **Enquête malariologique à la station d'essai de Giaray (Cochinchine)** [**Malarial Investigation in Cochín China.**]—*Bull Soc Path Exot* 1928 Apr 18. Vol. 21 No 4 pp 312-314

This spot was investigated in December 20 per cent of those examined were infected with one or other of the three malaria parasites thick drop examination being used and there being present in one case 1 500 plasmodia in 20 fields. No anopheles were found in the houses and inhabitants held that they were rare but the silence of the attack

GALLAIS (G.) Persistence du paludisme dans le département de la Meuse. [Persistence of Malaria in the Department of the Meuse.]—*Rev Méd et Hyg Trop* 1928. May-June. Vol. 20 No. 3 pp 83-84

In a homestead 13 km. from the source of the Aisne with marshy surroundings, certain inhabitants covering 4 generations have had febrile attacks yielding to quinine. The spleen was enlarged in two

C. L.

THOMYARD-NEUMAN (E.) Malaria und Asthma. [Malaria and Asthma.]—*Arch. f. Schiffs u Trop Hyg* 1928. July Vol. 32 No 7 pp. 308-302 [3 refs.]

Report is made on a series of 21 cases of asthma. They fall into two groups the one group older the asthma seasonal, malaria found in a third only of them and its treatment being without influence on the asthma the second group younger asthma non-seasonal, malaria invariable and the asthma yielding to quinine. All three species of parasite were implicated in about the proportion of their local distribution.

C. L.

ZALLOCCO (Antonio) Asma e malaria. [Malaria and Asthma.]—*Pediatrics*. 1928 May 15 Vol 36 No 10 pp 523-530 [Inst. of Clinical Pediat., Univ. Rome]

A child of 4 who had had measles and broncho-pneumonia, but not eczema or urticaria, experienced febrile attacks with rigors and sweating and an associated intense respiratory distress with troublesome cough but without expectoration. The attack seen was typical of asthma and was cured by adrenalin. Tertian parasites were present, and 0.5 gm. of quinine was injected daily. Fever ceased at the fourth injection, and the asthma disappeared instantaneously and did not return. The differential diagnosis and the reports of like cases by others are considered.

C. L.

DE PENNING (H. C.) Malaria and Appendicitis. [Memoranda.]—*Brit Med J* 1928. July 14 p 53.

Being unaware of any report of the confounding of malaria with appendicitis [see however this *Bulletin* Vol. 20 p 131] the author describes three of the several which have come his way during the last sixteen years. The common features have been fever and vomiting with pain and tenderness in the right iliac region. All showed benign tertian parasites at a blood examination and all cleared up immediately after an injection of quinine. The other side of the picture comprises two illustrative cases of appendicitis complicated by malaria and uninfluenced by quinine.

C. L.

LUNA GASÁN (José) Síndrome apendicular de origen palúdico. [Appendicitis or Malaria.]—*Siglo Médico* 1928. Aug 18. Year 75. Vol. 82 No. 3867 pp 148-149 [3 refs.]

The literature is considered and the points by which a malarial mimicry can be distinguished from appendicitis are held to be the overcoming by patience of the muscular defence greater pain on light than on deep palpation, free passage of faeces and flatus, full pulse, flushed face and a fall in temperature following a fairly abundant sweat.

C. L.

SIVAMANI (V) A Case of Malaria simulating Confusional Insanity —
Indian Med Gaz 1928 June Vol 63 No 6 pp 332-333

The essential features were a low degree of pyrexia associated with a violent noisy and irrational state failure to discover plasmodia, and immediate response to quinine

C. L.

DE AZEVEDO (A Penna) Alterations pulmonaires dans le paludisme
 [Long Changes in Malaria.]—*C R Soc Biol* 1928 Sept 18
 Vol 89 No 26 pp 888-890 [Oswaldo Cruz Inst Rio de Janeiro
 Brazil]

The report describes the pulmonary condition found post mortem in 9 cases varying from lobar pneumonia to congestion and oedema of the lower parts of the lungs Unfortunately the individual reports do not mention plasmodia

C. L.

SCHMIDT (F J W) Cas de paludisme aigu avec apoplexie cérébrale
 [Case of Acute Malaria with Cerebral Apoplexy]—*Ann Soc Belge de
 Méd Trop* 1928 Sept Vol 8 No 2 pp 165-167 5 refs]

A man about 30 admitted unconscious with many rings of *P. falciparum* in thick drop recovered consciousness after two injections of quinine but his speech was not understandable even to those who knew his dialect. A right-sided paresis with Babinski's sign gradually disappeared under quinine medication 1 gm daily by mouth and speech returned though a month later there was left a slightly abnormal gait

C. L.

RABBANI (S M) An Interesting Case of Malaria —*Indian Med Ga.*
 1928 Aug Vol 63 No 8 pp 450-451

A case showing subtertian parasites was treated with intragluteal quinine without benefit to symptoms although the parasites disappeared permanently from the circulating blood An intravenous injection was followed by temporary clinical benefit, but there was clinical relapse and recovery followed intravenous injection of 0.3 gm of neosalvarsan

C. L.

TATE (D Laurence) Ruptured Malarial Spleen Splenectomy Recovery
 —*Brit Med J* 1928 June 16 pp 1022-1023 With 1 text
 fig (Montego Bay Hosp Jamaica)

A violent fall on the abdomen two blood-stained stools, severe abdominal pain patient seen by Tate 30 hours after the accident with an acute abdomen At operation the peritoneum full of blood 5 ruptures in the spleen which was removed and weighed 16 oz Saline injections throughout operation, rectal salines for the next 24 hours uninterrupted convalescence leading up to gonorrhoea four weeks later

C. L.

STRUTHERS (E B) Nephritis with Oedema caused by Malignant Malaria.
 (The First Case of Malignant Malaria admitted to the Shantung Christian
 University Hospital.)—*China Med J* 1928 Apr Vol 42 No 4
 pp 299-300

Only numerous crescents were found in the blood of this case Under quinine improvement was rapid general anasarca disappeared in 4 days, albumin and casts in 6 Crescents persisted in small numbers on his discharge in good condition 13 days later

C. L.

BAKERJEE (Kali Gati) On Some Clinical Features of Malignant Tertian Malaria.—*Indian Med Ga* 1928, Apr Vol 63 No 4 pp 202-204

Diagnosis is clinical, treatment energetic, comprising for example 180 grains of quinine in solution within 54 hours and 44 grains within 8 hours for adults. SEXTON's alkaline method is preferred. Twelve cases are described classified as conulsive diarrhoea and miscellaneous, the last including hyperpyrexial urticarial and typhoid subtypes.

C. L.

SEXTON (J. A.) & BIRD (W.) Studies in Malaria, with Special Reference to Treatment. Part IX. Plasmochin in the Treatment of Malaria.—*Indian J Med Res* 1928 July Vol 16 No. 1 pp. 159-177 [47 ref]

Plasmochin was given to young male European soldiers suffering from tertian malaria in Kasauli where infection may be excluded, the men being in four series and treated as follows. Series I Plasmochin days and "rest" (in italics) days thus 5 d 3 d 3 d 2, 5 2, 5 2, 30 days 17 of treatment and 22 of rest. Daily dose by body weight was for 7 stone 0.05 gm. 0.01 gm. being added for every additional stone average weight 10 st. average total dosage 1.26 gm. Series II A total quantity of 2.4 gm. representing a course of 28 days with a daily dosage of 0.08 gm. If toxic symptoms showed a treatment was delayed, so that the time taken to complete the course was the measure of evident toxicity. Series III As in Series I but using plasmochin compound (0.1 gm. plasmochin and 1.25 gm. quinine daily) total plasmochin 1.7 gm. quinine 11.25 gm. Series IV A continuous course of 28 days as in II daily doses as in III total plasmochin 2.8 gm., quinine 35 gm.

Series I 29 patients treatment discontinued for toxicity in 2, 8 relapsed. Series II 22 patients treatment discontinued in 2, 3 relapsed. Time of treatment averaged 38 days, varying between 28 and 53. Series III, 15 patients treatment discontinued in 1, 2 relapsed. Series IV 20 patients in none was treatment discontinued for toxicity. None relapsed. Average duration of plasmodia in thick film with plasmochin 1.71 days, with plasmochin and quinine 0.73 days, and average duration of fever similarly 0.8 and 0.3 days. A 71 per cent. relapse rate occurred in 14 cases of subtertian malaria with plasmochin alone or compound. In 7 controls with quinine and alkali it was 14 per cent.

"The safety margin of the drug seems to be small. Up to the present the results of the treatment of less than 1,000 patients with this drug have been recorded, yet at least three deaths are known to have occurred as the result of the action of plasmochin and several cases of severe toxic effects have also been reported. If such events have occurred under the strict and careful conditions in which the drug has been tested, it seems to us that the time has not yet arrived when it can be given broadcast for use in general practice, however useful it may be under hospital conditions or under very strict and efficient medical supervision. In the present state of knowledge of the action of this drug it is essential, in our opinion, that every patient under this treatment should be seen at least once daily so that administration can be stopped as soon as the first signs of toxæmia are detected."

C. L.

UNITED FRUIT COMPANY BOSTON MASS SIXTEENTH ANNUAL
REPORT MEDICAL DEPARTMENT 1927 Section II pp 26-
81 84-86 [Plasmochin in Malaria.]

I **Plasmochin in Malaria.** By O T BROSIUS. [pp 26-52 (2 refs)]

Brosius has used (1) plasmochin tablets 0.02 gm each (2) plasmochin compound (0.01 gm and quinine sulphate 0.125 gm) (3) tablets with half the strength of the latter (which however MICHLENS has condemned and has had withdrawn this *Bulletin* Vol. 25 p 565) (4) tablets containing 0.01 gm plasmochin and 0.125 gm hydroquinine which have also been withdrawn. The results are fully tabulated. In 60 cases of tertian malaria treated with moderate doses of plasmochin namely 0.06 gm daily 10 suffered from cyanosis haemoglobinuria nausea headache or relapse. Of 18 cases of tertian malaria given 0.08 gm the dose had to be cut down in one for dizziness one had blackwater and all showed subtertian parasites in from 5 days to 10 weeks. Of 25 tertian cases treated with plasmochin 0.08 gm and quinine 1 gm daily 1 became positive again to plasmodia on the 16th day. Of 40 subtertian cases treated with plasmochin 0.06 gm and quinine 0.75 gm daily two had gastric pains one had epistaxis pallor suggestive of cyanosis vomiting and gastric distress. It is noted of one that he had no ill-effects from a long plasmochin treatment but not that it amounted at a maximum to 0.02 gm daily and that he became positive to treatment during a pause in it. Of 28 subtertian cases receiving 0.06 gm plasmochin and 1 gm not 0.1 gm as stated quinine daily one died on the fourth day with what is described in a post mortem report as malaria with early lesions of typhoid fever. The lesions in the spleen and liver are characteristic the gut is not mentioned. In another plasmochin had to be stopped on account of gastric pain. Of 20 subtertian cases receiving 0.08 gm plasmochin and 1 gm quinine one died on the fifth day the autopsy showing hepatic cirrhosis but no microscopic report being given. Three relapsed. The conclusion which not all will think that the evidence justifies is— A study of this series must be convincing that it is safe to administer plasmochin with quinine in moderate dosage in the dispensary clinic and that this combination is an efficient therapeutic agent.

II **Some Observations in the Limon and Panama Divisions of the United Fruit Company with Special Reference to Certain Measures for the Control of Malaria December, 1927 to February, 1928**
By M A BARBER & W H W KOMP [pp 54-62]

Barber and Komp used thick films and found only 8 cases with gametocytes sufficiently numerous to afford likelihood of regular mosquito infection. Cases may relapse soon after plasmochin quinine treatment and may become dangerous carriers. Crescents may first appear in the blood or may increase during this treatment. One case re-examined 2 to 3 weeks after treatment at whose close he had been seemingly parasite-free showed crescents far more numerous than in any case we encountered in our surveys. These cases were infective for mosquitoes. It is concluded that in his paper abstracted above Dr Brosius has demonstrated the safety of unsupervised plasmochin and quinine and has laid the foundation for the most effective use of this new drug.

TABLE III
Quinin Intolerance Cases.

- 1 Tertian malaria vomited repeatedly after quinin took plain plasmochin without discomfort
- 2 Cases tertian, quinin intolerance made a good recovery without symptoms on plasmochin plain.

TABLE IV
Toxic Symptoms

- 1 case tertian malaria, after 38 tablets plasmochin compound, epigastric burning
- 1 case tertian and E. A., after 33 tablet plasmochin plain and quinin cyanosis
- 1 case tertian after 28 tablets plain plasmochin cyanosis
- 1 case tertian, after 27 tablets plain plasmochin cyanosis, vomiting, epigastric pain.
- 1 case estivo-autumnal after 31 pill plasmochin compound, pyrexia

C. L.

M HUTCHINSON (G. B.) & DUFF (W. R.) *The Treatment of Malaria by Plasmoquine Compound.*—*Malayan Med J* 1928 June Vol. 3, No. 2, pp. 69-73.

"(1) Seventeen cases reacted favourably to treatment by plasmoquine compound alone

"(2) The drug proved invaluable in a case of marked quinine idiosyncrasy

"(3) The combination of plasmoquine compound three tablets with thirty grains of quinine daily had a remarkable effect in reducing within a short space of time the size of chronically enlarged spleens

"(4) Five cases reacted abnormally—two relapsed in spite of and during treatment and were ultimately cured by quinine and three developed plasmoquine intolerance. Of the signs of intolerance noticed epigastric pain, colic and cyanosis are already well known—in one of our cases the cyanosis and pain were delayed for 12 hours after withdrawal of the drug and were most marked 36 to 40 hours after treatment had stopped. An action on the circulatory mechanism resulting in slowing of the heart rate is suggested as an additional sign of plasmoquine intolerance upon this effect vertigo, deafness and tinnitus may be dependent."

C. L.

FISCHER (Otto) *Ueber die Grenzen der Plasmochin-wirkung bei der Behandlung der natürlichen menschlichen Malaria.* [The Limits of Action of Plasmochin in the Treatment of Malaria.]—*Musnick Med. Woch.* 1928, Aug. 10 & 17 Vol. 75 Nos. 32 & 33 pp. 1369-1372 1417-1419 With 12 charts in text. [32 refs.] [Inst. for Ship & Trop. Diseases, Hamburg]

Fischer concludes as a result of his work and that of others that the daily dose of plasmochin sufficient for the treatment of tertian malaria is 0.01 gm. per 10 kgm. of body weight or say 0.03 gm. in an ordinary person. In subtertian malaria a total of 0.15 gm. as injection or 0.2 gm. by mouth, whether given in the course of several days or within 24 to 36 hours, suffices to remove crescents from the peripheral blood in a period averaging 5 days—in fresh cases larger doses are necessary if their appearance is to be prevented. But in order to

destroy schizonts at the same time quinine preferably 1 gm (gr xv) daily should be given at the same time Methaemoglobinaemia was absent or practically negligible. Failure of plasmochin was extraordinarily rare. It was noted three times in subtertian cases.

C. L.

KARAMCHANDANI (P. V.) **Plasmochin as compared to Quinine in the Treatment of Malaria.**—*Indian Med Gaz* 1928 May Vol 63 No 5 pp 249-252. With 2 charts in text.

In one case of pneumonia complicated by tertian malaria quinine and sodium nucleinate gave a leucocyte count of 5500. In another in which plasmochin took the place of quinine it was 11000. One case of *P. vivax* infection was treated by plasmochin and one of *P. falciparum* with plasmochin compound. The leucocytosis showed little difference. Three cases of malaria are reported as cured by plasmochin when quinine was believed to have failed.

C. L.

SCHIASSI (F.) & MERIGHI (G.) **La plasmochina nella cura della malaria dei bambini [Plasmochin in the Cure of Malaria in Children.]**—*Policlinico Sez. Prat.* 1928 May 14 Vol. 35 No 19 pp 893-898.

35 tertian and 6 subtertian cases were treated with plasmochin in 0.06 gm. doses for an adult daily for 7 days and thereafter for the last 4 days of 5 more weeks. The daily doses in grams for children were—up to 6 months 0.01 to 0.015, 6 months to 2 years 0.02, 2 to 6 years 0.03, 6 to 12 years 0.04. The advantages of plasmochin are its solubility and tastelessness. Cyanosis unaccompanied by other symptoms is a matter which cannot be disregarded.

C. L.

MAJUMDAR (Akhil Ranjan) **Some Observations on the Anti Malarial Properties of Plasmochin.**—*Indian Med Gaz* 1928 July Vol. 63 No 7 pp 394-396. With 4 charts in text.

Majumdar describes four cases treated with plasmochin compound. In one with vomiting the 6 tablets daily did not increase it but it is interesting to note that the quinine which after all is there though it is disguised under the term compound, was taken in sufficient quantity to produce cinchonism.

C. L.

DE BUEN (Sadi) **Nota preliminar sobre un ensayo de plasmochina y quinetum en ambientes rurales. [Plasmochin and Quinetum in Rural Work.]**—*Medicina Paises Calidos* Madrid. 1928 May Vol. 1 No 3 pp 242-249.

In cases treated in hospital crescents disappeared on the average in 3 days under plasmochin and in 7.6 under quinine. The dose of plasmochin has been as high as 0.12 gm. daily in a boy of 15 but in nearly all the 20 cases quinine was also given. In rural work, it is stressed, administration must not at present be left in the hands of subordinates. Quinetum the mixed alkaloids of cinchona, proved as serviceable as quinine.

OLIVIER (P. H.) & HILSHOFF (A. A.) The Treatment of Malaria with Plasmochin and Plasmochin Compositum.—*Meded. Dissert. & Volksgezondheid in Nederl. Indië* 1928. Vol. 17 Pt. 1 pp. 80-91 With 2 folding charts. 18 refs.

Apparently the dose given were those advised by the makers, namely 0.05 gm. plasmochin, or 0.03 gm. plasmochin and 0.75 gm. quinine. Cyanosis and stomach trouble were rarely noted. In tertian and quartan malaria plasmodia disappeared in a few days, but relapses occurred in a number of cases. In subtertian malaria the effect on the ring was unsatisfactory, crescents on the average disappeared in 6 days and wul. plasmochin compound in 4 days, yet in both cases they might actually appear after 4 to 6 days. It is advised that the course of treatment should last 21 days. Plasmochin agreed well with a blackwater case. The drug must at present at least be "used only under strict medical supervision."

C. L.

WALRAVEN (P.) with the collaboration of VALCKE (G.) & BEQUAERT (M.) Observations concernant le traitement de la malaria par la plasmochine. [Treatment of Malaria by Plasmochin].—*Ann. Soc. Belg. de Méd. Trop.* 1928 June Vol. 8. No. 1 pp. 73-79 [Bact. Lab. & Hosp. Elisabethville Belgian Congo.]

Fourteen cases of m. tertian malaria were treated with plasmochin compound tablets 6 to 8 daily in 3 courses of 5 days each with 5-day intervals. In 5 of them there was evidence of intoxication, cyanosis, gastric troubles, headache, depression. In one plasmochin was effective where quinine disagreed. Disappearance of parasites was generally rapid, but no distinction seems to be drawn between schizonts and crescents. It is held that its action on parasites and fever is less rapid than that of large doses of quinine (2 to 2.5 gm.) and that it is not always well tolerated.

C. L.

ROSKOFF (E. R. A. Louke) & SIXO (R.) Ervaringen met plasmochin. Experience of Plasmochin.—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68 No. 1 pp. 80-88. With 1 plate & 3 charts. 1 ref. Chem. Associated Mining Companies of Billiton, Tandjong Pagar Dutch East Indies.

Plasmochin, it is concluded, has a strong influence on plasmodia, particularly on crescents, an influence morphologically emphasized by a good coloured plate. It also lessens the splenomegaly. It is felt that the question of relapse or reinfection has not been determined in these experiments. Complications due to the drug were infrequent in the 45 cases listed, but it is noted that there may occur entirely novel phenomena. It is very important to determine the liver function so as to collect data regarding the working of plasmochin. The main entero-crisis in the main entero-crisis. The drug should remain in the medical hands and the treatment be carried out in a clinic.

C. L.

DE LUCA (Benedetto) La plasmochinoterapia nella malaria (The Plasmochin Treatment in Malaria).—*Riv di Malarologia* 1928 July-Aug Vol 7 No 4 pp 484-502 With 18 charts on 4 plates [67 refs] [English summary p 627]

In tertian and quartan cases plasmochin shows itself almost as efficacious as quinine. Fever attacks subside and cease in 2 or 3 days and the parasites usually disappear from the peripheral blood after 3 to 4 days.

In subtertian cases the drug shows an effective action in destroying the sexual forms of the parasites which rapidly disappear but the small rings resist longer and fever only slowly decreases. Moreover the drug acts only in the mild or not very severe cases.

The plasmochin-quinine association is absolutely efficacious in subtertian attacks. The action of plasmochin upon the gametocytes is then combined with the action of quinine upon the schizonts.

Quinine is absolutely superior to plasmochin in severe pernicious fevers.

Relapses are not prevented even by the best plasmochin treatment. This however shows the best results in haemoglobinuric fevers, quinine idiosyncrasy and malaria in children.

The plasmochin toxicity is minimum, the tolerance very good but some symptoms (cyanosis and gastric disturbances) which follow the use of the drug leave an unfavourable impression.

C. L.

PALMA (Modesto Dalla) Considerazioni sulla plasmochinoterapia della malaria. [Plasmochin Therapy in Malaria].—*Riforma Med* 1928 June 18. Vol 44 No 25 pp 753-756 With 1 text fig [31 refs]

Plasmochin was given for 3 days in doses of 0.12 gm and then for 20 days in doses of 0.08 gm. *P. vivax* actually disappeared in 60 hours but on account of previous resistance to quinine the drug was continued as noted. On the 5th day the patient started a right basal croupous pneumonia but in accordance with Schlesinger's experience the drug as just noted was continued. Crisis came on the 9th day of giving the medicament. Cyanosis which had been present during the pneumonia increased on the 14th day of administration with bilious vomiting and asthenia, but no dyspnoea. Methaemoglobin was never found in blood or urine although the former was chocolate coloured. When cyanosis was at its height there appeared in the red corpuscles rounded bodies staining dark with the May-Grünwald-Giemsa stain and which are identified as Ehrlich Heinz bodies or the capsule of the endoplasm of the corpuscle.

C. L.

PRADO (Alcides) O tratamento da malaria pela plasmochina. [Treatment of Malaria by Plasmochin].—*Sciencia Med* 1928 July Vol 6 No 7 pp 317-322 [4 refs]

Two cases of tertian and one of subtertian malaria were treated with 6 to 8 tablets of plasmochin compound daily. The two former relapsed and in one of them treatment had to be stopped on account of abdominal pain. The last was cured. He had taken 132 tablets.

C. L.

RODRIGUEZ OLIVA (Rafael) Un caso de paludismo con grave intolerancia a la quinina tratado con plasmochina. [Case of Malaria Intolerant to Quinine treated by Plasmochin].—*Medicina Paises Calidos* Madrid 1928 Sept. Vol 1 No 5 pp 452-453

In a case of subtertian malaria quinine produced urticaria uncontrollable vomiting and nervous and mental symptoms with loss of consciousness.

He was given 0.08 gm. of plasmoquin daily for 8 days. The first dose produced urticaria which was however controlled by five drops of the official adrenalin solution. All plasmodia disappeared from a thick drop on the day after the treatment was begun and did not reappear. The stoppage of administration was due to appearance of cyanosis.

C. L.

BRONX (A.) La plasmoquine dans le traitement de la malaria. *Plasmoquin in the Treatment of Malaria.*—*Ann. Soc. Belge de Méd. Trop.* 1928. June Vol. 8 No. 1 pp. 65-72. 8 refs. [School of Trop. Med., Brussels.]

The six cases described fall in with general experience.

C. L.

MAZZA (Salvador) Acción de la plasmoquina sobre los gametocitos de infecciones espontáneas por hemoproteus. *Effect of Plasmoquin on Haemoproteus.*—*Prensa Méd. Argentina.* 1928. June 10 Vol. 15. No. 1 pp. 55-58.

The author tried plasmoquin on three species of birds infected with *Haemoproteus*. The first was a falcon weighing 93 gm., showing one parasite to every 10 field. It was given 0.05 gm. of plasmoquin. The following day the parasites were becoming accolated, but were as numerous as before and the dose was repeated. The next day one parasite only was found in 40 fields and 0.01 gm. was given; thereafter no more were found.

The second was a thrush infected with both *Haemoproteus* and *Trypanosomes*, but neither in large numbers. On three successive days it was given 0.005, 0.0025 and 0.0025 gm. a second thrush was given 0.003 gm. only. Both died soon after but neither *Haemoproteus* nor *Trypanosomes* were found again before death nor on examination of the heart blood post mortem.

The third was a *Brachyptera*, one of the *Fringillidae* which for six months had constantly shown *Haemoproteus* in its peripheral blood. Its weight was 18 gm. and it was given 0.001 gm. of plasmoquin. On the following day a single parasite was found and thereafter none. The dose had thus sufficed to render the blood sterile.

H. Harold Scott

SHABA (B.) Report on Some Grave Cases of Malignant Tertian Malaria treated with Intravenous Injections of Quinine.—*Calcutta Med. J.* 1928. Sept. Vol. 23 No. 3 pp. 117-123.

Having seen death from fall in blood pressure after intravenous quinine as ordinarily given, Shaba has adopted the use in malarial emergencies of smaller and repeated doses 3 grains or less in divided doses intravenously. He has lost only 2 cases in 48 and urges the need of active intervention in these conditions unless one is to stand by and witness as he strikingly says "the passing of the life to the other end of eternity."

C. L.

DE LA TORRE (Theodore) Intramuscular Injections of Quinine.—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston Mass.* 1927 pp. 82-84 [Banes Hosp., Banes Cuba.]

De la Torre has given 9 000 quinine injections into the glutei and the local records of cases of malaria have dropped to the lowest of any

district and blackwater fever has practically disappeared. The average case gets 1 gm daily for 4 to 6 days (ampoules containing 1 to 1½ cc. of solution of dihydrochloride in doses of 0.25 to 1 gm) and then twice a week for at least three weeks and thereafter. Pink Tonic Pills. After each injection he is if possible put on horseback and sent for a massage ride. Only four abscesses have been seen two in children and two in women.

C. L.

MEGAW (J. W. D.) GHOSH (Sudhamoy) & CHATTERJEE (N. R.) **Solutions of Quinine.**—*Indian Med Gaz* 1928 May Vol 63 No 5 pp 244-247 [Calcutta School of Trop Med]

Of 90 stock solutions of quinine examined mainly in tea estate hospitals about a quarter were at least 25 per cent below stated strength, and about 40 per cent were deficient to the extent of at least 10 per cent. In one case a solution purporting to contain gr 10 contained actually gr 2½. Some of the accurate results were perhaps so because news of a coming inquiry leaked out. The amount of quinine which is stated on the prescription bears no necessary relation ship to the amount which is actually swallowed. Details of a rough test are given by which a medical officer may check the amount of the drug in his dispensary solutions.

C. L.

YAMANAKA (S.) **On the Treatment of Malaria with the Total Alkaloids of Cinchona, "Panchina."**—*Taiwan Igakkaï Zasshi (Jl Med Assoc Formosa)* 1928 May No 278 English summary p 40 [In Japanese] [Intern Dept Govt. Med College Formosa.]

This preparation of the total alkaloids of cinchona consists of sulphate of quinine 20 quinidine 10 cinchonine 35 cinchonidine 20 or 85 per cent of crystallizable alkaloids. Treatment of 27 cases suggests that 1 gm. daily is unsatisfactory 1.5 to 2 gm efficacious and 3 gm too poisonous.

C. L.

CARROLL (R. L.) **Effects of Quinine on Malaria Parasites.**—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 81-82 [Almirante Hosp Almirante Panama]

Of 100 cases 11 showed gametes on admission and 18 more during quinine treatment. Most of the cases were subtertian. The dose ordered was 45 grains daily for a week and thereafter 30 gr. Examination was daily by thick film.

C. L.

DRAPER (A. P.) **Early Treatment of Malaria.**—*Jl Roy Army Med Corps* 1928 Aug Vol 51 No 2 pp 135-137 With 2 charts

A heavily infected company was treated with 20 grains of quinine sulphate in solution daily for ten days and thereafter the same dose on 2 days a week for 3 months irrespective of diagnosis. Its improvement has been marked, as judged by admissions to hospital.

C. L.

BOULAY (A.) LIQUERRE (H.) & MITARD (L.) Sur le passage de la quinine dans le lait maternel. [Excretion of Quinine in the Mother's Milk].—*Bull Soc Path. Exot* 1928 June 13. Vol. 21 No. 6 pp. 468-472. [10 refs.] [School of Med. Dakar French West Africa.]

After citing published work of others the authors describe their own experiments. They administered to ten mothers the ordinary prophylactic dose used in French West Africa, namely 0.5 gm. once daily of gumine hydrochloride in cachet. 10 to 15 cc. of milk were drawn off at intervals and added drop by drop to ten times its volume of 96 per cent. alcohol containing 2 per cent. of acetic acid, stood for half-an-hour shaken and filtered. The amount of quinine in the filtrate is estimated by Tanret's reagent after it has been subjected to certain purifications. By this means it was found that excretion may begin in $\frac{1}{2}$ hour and is complete in 1 hour the total quantity of quinine recovered varying from 1 to 5 mgm. As this is a fifteenth to a tenth of the dose given at Dakar to an infant it is insufficient to cure.

C. L.

CRUCA (M.) & ALEXA (I.) Traitement de la malaria par le stovarsol. [Treatment of Malaria by Stovarsol].—*Arch Roumaines Path. Experim. et Microbiol.* Paris 1928. Jan. Vol. 1 No. 1 pp. 105-114. [Isolarea Infectious Diseases Hosp. Jassy.]

The work is confirmatory of MARCHOUX'S. All forms of *P. vivax* disappear from the blood after a minimum dose of 0.5 gm. of sodium stovarsol intravenously but relapse occurs within ten days. A daily dose of 1.5 gm. has not been exceeded but total dosage irrespective of age has varied between 0.25 and 16 gm. The spleen has never been completely reduced. Of 20 cases of this infection 9 have shown acute nephritis with albumin, blood and casts, disappearing on cessation of treatment but not interfering with the subsequent administration of quinine. In the one case of quartan and six of subtertian malaria the drug was completely inactive to schizonts and gametocytes. When given the urine must be examined daily and the drug stopped on the least suggestion of renal irritation.

C. L.

SHAW JR (Edwin H.) The Absorption of Chemical Compounds by Red Blood Corpuscles and its Therapeutic Significance in the Treatment of Bird Malaria.—*Amer. J. Hyg.* 1928. July Vol. 8 No. 4 pp. 583-603. [9 refs.] [Dept. of Chem. Johns Hopkins Univ. Baltimore Md.]

HEGNER (Robert) SHAW JR (Edwin J.) & MAXWELL (Reginald D.) Methods and Results of Experiments on the Effects of Drugs on Bird Malaria.—*Ibid.* pp. 564-582. [33 refs.]

The position taken starts from the basis that plasmodia are certainly intracellular (thus *Bulletin* Vol. 25 p. 574). Accordingly a drug which affects them must penetrate red corpuscles. The writers' studies on cinchona derivatives, quinoline derivatives and dyes have shown that only those compounds which do not have ionic groups are absorbed. The method of experimentation is that red cells are freed from white corpuscles by 5 washings with a gelatine containing physiological salt

solution the gelatine protecting the corpuscles from mechanical injury. Solutions of the substances are then added to them and difference between the amount of the substance recovered from the fluid compared with that recovered from a control is taken as the measure of absorption. The relative solubilities in human corpuscles were quinine 4.6 quinidine 4.6 cinchonidine 3.5 quinatovine 4.3 hydroquinatovine 4.1 cinchotinine ethyl ester 2.6 quitenine 0.2, quinine methochloride 0.2 phenyl p-arsonic acid azo-hydrocupreine 0.1. The reports are full of detail.

C. L.

PLEHN (A.) Zur Frage der natürlichen und der medikamentösen Heilung der Malaria. [*Natural and Therapeutic Cure of Malaria.*] — *Ztschr f Hyg u Infektionskr* 1928 July 3 Vol 108 No 4 pp 685-699 [25 refs.]

Plehn describes a number of experiments on 5 cases of subtertian malaria which lead to the conclusion that the serum of one who has been spontaneously cured of and become immune to malaria has no lethal effect *in vitro* on the parasites of another man suffering from this infection. The same holds for serum obtained during the paroxysm. Complement disappears from the serum in strong malarial attacks but the action of quinine is uninfluenced thereby. The mode of action of quinine is undetermined, but splenic enlargement is presumably defensive.

C. L.

MARTELLI (Bier Nello) & MASCAGNI (Giuseppe) La Smalarina nella Malaria (*Smalarina and Malaria.*)—*Riv di Malariologia* 1928 May-June Vol. 7 No 3 pp 277-300 With 1 chart [English summary p 406]

Smalarina was useless.

C. L.

DE MELLO (Froilano) & VERNENCAR (H. P.) Contribuição ao estudo do valor terapêutico da Smalarina Cremonese [*Therapeutic Value of Smalarina.*]—*Arquivos da Escola Méd Cirurg de Nova Goa* 1928 Ser A No 3 pp 339-385 French summary pp 385-391 [Bact Inst Nova Goa.]

Minutely kept records show that smalarina is useless for prevention or cure.

C. L.

SCHÜFFNER (W.) Malaria tertiana. Die Entwicklung der Sporulationsform Doppelinfektionen und Bemerkungen ueber die sogenannte Parthenogenese der Makrogameten. [*Tertian Malaria. Development of Sporulating Forms, Double Infection, and Parthenogenesis.*]—*Cent f Bakt I Abt.* Orig 1928 Aug 21 Vol 108 No 5-6 pp 297-304 With 7 text figs & 1 coloured plate [Trop Hyg Inst Amsterdam]

— Berichtigung zur Arbeit Malaria tertiana. —*Ibid* Sept, 26. No 7-8 p 456

Schüffner's paper is accompanied by a plate of coloured microphotographs showing multiple infections (a) with schizonts and schizonts

(b) with schizonts and sexual form both male and female. He finds that in schizogony there is displayed with strong Ciemsa a violet coloured body attributable to the periphery of the microzoot. He finds neither in the literature nor in his own preparations any justification for SCHAUINSKY's conclusion that the macrogamete produce a schizont parthenogenetically and he confirms the observation that although rarely they are to be found in the same corpuscle a microgamete and a schizont. The schizont presumably reaching the position in the same way and if it were a before hatched the male remains free from the stigma of a parthenogenetic parent.

C. L.

PRETZNER H. O. J. Zur Morphologie der Parasiten der chronischen Malaria. *Morphology of Parasites of Chronic Malaria.* — *Cent f. Bak. I. Abt. Orig.* 1928 July 25 Vol. 108 No. 14 pp. 73-81. With 5 h. 11 pl. 10 ref.

Tracing its path in duration from splenic enlargement to clear blood there will generally speaking be no relapse. If relapse occurs the splenic enlargement is at first normal but not always intra-splenic. It is not to be taken in this way. They may be found and taken away in the Ciemsa and then sent further investigation. It is not to be taken in this way.

C. L.

VAN DER LINDEN J. M. L. L. Laftbraak bij malaria chronica en andere bloedvervalsingen. *Blood Destruction in Chronic Malaria.* — *Voor Indis.* 1928 Vol. 68 No. 7 pp. 401-1. — *Military Med. Lab. Willemstad.*

In a patient with malaria the uric acid was increased up to 20 times the normal quantity. When the fever was over the parasites in the blood (primary uric acid) were more strikingly increased, but rapidly declined when the temperature fell. In chronic malaria the quantity of faecal uric acid was greater than normal even in the absence of fever and was yet further increased during relapse and the same holds for erythritic and chronic septic polyneuropathies but not for other sorts. The uric acid output is the most exact measure of blood destruction yet known. It shows that the percentage of red cells coloured by vital staining according to the Chantard-Widal technique is a fair measure of the uric acid output and much less likely to affect so that it may perhaps replace it.

C. L.

ARELLANO (Juan M.) Estudio de la bilirrubinemia en la malaria. *Bilirubinemia in Malaria.* — *Crónica Médica* Lima. 1928 May Vol. 45 No. 79 pp. 144-147.

The writer summarizes knowledge of bilirubinemia in malaria. Malaria affects the reticulo-endothelial system in blood, spleen and bone marrow and in malaria the indirect reaction is frequent but of variable intensity. The exaggeration of event is exaggerated destruction of red cells. The sequence of event is bilirubinemia and malarial corpuscles, excessive formation of bile, jaundice and haemolytic.

C. L.

PORTO RICO REVIEW OF PUBLIC HEALTH AND TROPICAL MEDICINE
1928 Mar Vol 3 No 9 pp 376-385 Report of Bureau of
Malaria Control 1926-27 Paper IV

Precipitin tests showed that when *A. albimanus* was given a choice of man compared with horse, ox, goat and pig it showed a marked preference for domestic animal blood even when it had to pass over man, or had also to surmount some difficulty as well to reach the animal. In *A. grabhami* the preference for animal was even greater.
C. L.

TALIAFERRO (William H.) & TALIAFERRO (Lucy Graves) A Precipitin Test in Malaria. Second Report.—*Jl Preventive Med* 1928 Mar Vol. 2 No 2, pp 147-167 With 3 figs. on 1 plate [17 refs] [Dept Hyg & Bact Univ Chicago] also in *Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 232-247 With 3 figs [17 refs]

The authors' own conclusions are as follows:—

A second series of 1438 precipitin tests on the sera of 298 persons with 75 different malarial antigens indicates:—

1 The most satisfactory type of antigen used in our first work—the one prepared from placentas heavily infected with *P. falciparum* by mincing in a meat chopper, extracting with ether, digesting the ether-insoluble portion in Coca's solution—may become acid. In the acid condition it is not reactive, but after adjustment to a pH of 7.8 it is an efficient antigen. Thus seven lots of this antigen with a pH of 7.8, in 154 tests on 64 serums, gave the following average results: 32 serums from infected persons gave 30 positive (4+++ 11++ and 15+) 1 doubtful and 1 negative. 32 serums from persons negative in the thick film gave 1 positive (+) 4 doubtful and 27 negative.

2 Five lots of an antigen prepared from the blood squeezed out of a placenta infected with *P. falciparum* by concentrating the malarial parasites by centrifugation, drying *in vacuo* over sulphuric acid, digesting the dry powder in N/20 HCl for not over 20 hours, and adjusting the pH of the supernatant to about 7.8 with N/20 NaOH, gave the following results when tested with 78 serums: serums from 34 infected persons gave 29 positive tests (3+++ 14++ and 12+) and 5 negative tests; serums from 44 persons not infected gave 9 positive tests (no+++ 2++ and 7+) 3 doubtful positives and 32 negatives. It seems probable that the dried concentrate can be preserved over long periods. Preliminary tests with an antigen prepared by extracting the same type of concentrate with Coca's solution and preserving under toluol also gave promising results.

3 No marked success was obtained from various antigens prepared from an infected spleen or from concentrated cultures.

Coca's solution is NaCl 0.7 NaCHO₃ 0.05 phenol 0.4 water to 100. An antigen, that is in this case the material used in *in vitro* tests of great concentration was obtained by the methods of BASS and JOHNS (*Amer Jl Trop Dis & Prev Med* 1915 Vol 3 p 298) of centrifuging placental juice in a case where the subtertian schizonts were full sized, for 30 minutes at 2800 revolutions a minute. The large schizonts form a thick chocolate-coloured layer on the top of the red cells and may be examined at once or after washing in normal saline. The upper layers of red cells contain the small parasites. There seem to be unexplored possibilities in this direction as a preliminary to a thick film diagnostic examination. [For the authors' first report see this *Bulletin* Vol. 25 p 149]

C. L.

SEMANIN (P.) Experiments on Infection of *Anopheles maculipennis* Mg. with Malaria Plasmodium from a Quinine treated Malaria Patient. —*Rev Microbiol et Epidemiol* 1928. Vol 7 No. 2. English summary pp. 225-226 In Russian pp. 149-155 8 refs.] [Malaria Station Barnaul]

It seems from the English abstract that the specimens of *A. maculipennis* were fed in Barnaul, Siberia on 14 malaria patients who had taken quinine and that some were examined there and others after being transported to Leningrad a journey which did not affect development of plasmodia. Both *P. vivax* and *P. falciparum* were concerned. Regarding the former 9 of 11 mosquitoes fed after the patient had taken 1.8 gm of quinine became infected regarding the latter 50 of 87 bowed oocysts or sporozoites while in 2 cases the quinine taken amounted to 22.8 and 25.2 gm.

C. L.

SMIRNOVA (L. W.) & SEMANIN (P. I.) Sur la question de la corrélation entre le nombre des gamètes du sang de paludéens et le nombre des oocystes sur la paroi gastrique de l'anopheles. [Numerical Correlation between Gametes in Malarial Blood and Oocysts in Mosquito's Stomach. —*Russian Jl Trop Med* 1928. Vol. 6. No. 1. French summary pp. 69-70. In Russian pp. 38-46. With 9 text figs. 4 ref.]

49 female *A. maculipennis* were fed on 11 patients whose blood contained from 9 to 125 crescents per 500 leucocytes. Specimens in every batch became infected but the number of oocysts formed had no direct relationship to the number of female crescents presumably imbibed. It is believed that to get a 4 per cent. infection crescents should number at least 150 to 200 per μ mm.

C. L.

POZZI (Arnaldo) Studio sul midollo osseo nei malarici. [The Bone Marrow in Malaria. —*Fisichinica Sez Med.* 1928. May 1. Vol 35 No 5. pp. 267-279. With 2 figs. on 1 coloured plate. 16 refs.]

Armed with a bistoury, a periosteal elevator and a small trephine, Pozzi has investigated under local anaesthetic the cancellous bone marrow of a rib in 3 cases (II, III and IV) and of the head of the tibia in (I). The findings were —

	I	II	III	IV
Normoblasts	35	45	10	25
Granular cells	45	37	10	25
Undifferentiated cells	20	18	80	50

The normal count is given as—normoblasts 36-44 granulocytes including promyelocytes myelocytes and polynucleated 41-25 and eosinophil 2-61.

C. L.

ZIA (S H) & FAUST (E C) Results obtained from the Inoculation of Human Malarial Parasites into Experimental Animals, including those subjected to Provocative Treatment.—*Rev de Malariologia* 1928 May-June Vol 7 No 3 pp 301-303 [4 refs] [Peking Union Med College Peking China]

Zia and Faust attempted to produce infection by *P vivax* or *P falciparum* by inoculating blood from acute cases into hamsters rabbits and guinea-pigs about two months old, some of them made susceptible by previous splenectomy or strychnine injection. All attempts failed

C L

*PEREKROPOW (G J) Zur Frage nach den lytischen Eigenschaften des Blutserums Malariakranker in ihrer Wirkung auf die Malaria parasiten. (Ueber die Schizontolytine Abrami und Carnots beim Paludismus) [Lytic Properties of the Blood Serum in Malaria and its Action on Parasites].—*Ztschr f Immunitätsf u Experim Therap* 1928 Aug 8 Vol 57 No 3-4 pp 219-228 [31 refs]

Perekropow's conclusions are that at the beginning of a paroxysm there are in the serum bodies lytic to plasmodia which have almost disappeared towards its end. They are destroyed at a temperature of 36° C. nothing can be said of their character and perhaps they vary with species Gametes seem specially resistant Possible implications of the observation are considered.

C L

WARASI (W) Ueber die Entstehung des Malariapigments. [Origin of Malarial Pigment].—*Arch. f Schiffs u Trop-Hyg* 1928. Oct Vol 32 No 10 pp 513-517 [16 refs] [Inst for Trop Diseases Tiflis]

The quartan parasite produces more pigment and dehaemoglobinizes the red corpuscle less than does the tertian parasite If the precipitation of haemoglobin derivatives were the result of fermentative katabolism of haemoglobin, then, so runs the argument different quantities should not be produced, so that seemingly the malaria parasite builds its pigments from assimilated material or from the permanent portions of its own body

C L

WALKER (J) La formule leucocytaire de la malaria. Note préliminaire. [The Leucocyte Formula in Malaria].—*Bull Méd du Katanga* 1927 Dec. Vol. 4 No 4-5 & 6 pp. 138-139

The large mononuclear increase in malaria is well known An eosinophilia in convalescence is stressed as shown in such a count as the following Haemoglobin 75 polymorphs 48 lymphocytes 37 eosinophils 9 large mononuclears 6 In the absence of evidence of intestinal parasites eosinophilia should be considered as malarial.

C L

HANDERS (Otto) Was hat die Malaritherapie der Parantenkunde geleistet? (What has Malaria Inoculation Therapy added to Knowledge of Parasitology?)—*Wien Med Woch* 1928 July 7 Vol. 78 No. 23 pp 917-919 23 ref

Handers enquires whether study of injected malaria has added to our knowledge and whether such knowledge as may have been acquired is applicable to mosquito-carried infection. In morphology he quotes Horro and others as finding gamete like form which may in all particulars resemble gametes and explain it as an evidence of resistance to adverse conditions, correlated with quinine resistance of gametes. Yet surely if plasmodium as has been discovered before quinine handers' suggestion would not be made. In biology he instances the gamete in Vienna train failed to survive for years by direct injection and incapable of being cured by araphen. But see RUGES note p 4 supra so that we learn without evidence that direct transmission caused the peculiarities. In immunity he discusses the difficulty in producing and infecting which some have reported and the possibility of having a partial immunity from such patient.

C. L.

HOTTA (A) Experimentell Untersuchung über die Malariaheilwirkung. **Studies on Malaria Therapy**—*Cent f Bak* 1 Abt (Orig) 1928 June 30 Vol 15 No 6 pp 369-374 6 refs
Serum Control Station & State Growth C. Inst. Vienna

Reasoning and experiment lead Hotta to the conclusion that the therapeutic value of malaria lies in making the freezing into the circulation of katabolic products. These products built by the parasites from the red corpuscles have perhaps an elective working on those tissues of the brain altered by *T. pallidum*.

C. L.

KOPELOFF (Nicholas) & FIERTZ (Charles) **Parasites in Artificial (Inoculation) Malaria**—*Proc Soc Exp Biol & Med* 1928 Apr Vol 25 No 7 pp 562-565 1 ref [P] C Inst.
Ward's Island, N.Y.

A single strain of *Plasmodium* maintained during the last 5 years at the examination were made on 4 patients which there was a total absence of GERSTMAN'S species.

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infections the average incubation period was 5 days in the former and 12.7 days in the latter while the preliminary fever occurred in 88 per cent of the former and 40 per cent of the latter and lasted in the mean 3.3 and 2.3 days respectively. Regarding blood groups preliminary fever was invariable. It lasted in the mean 3.7 of the 4.5 days of average incubation when groups corresponded and injection was intravenous in other cases incubation was longer and preliminary fever less consistent and of shorter duration

C. L.

LAMBERT (Louis) L'accès paludéen ne paraît pas être du à un choc hémoclasique [The Malarial Attack not due to Haemoclastic Shock.] —C. R. Soc. Biol. 1928 July 27 Vol 99 No 25 pp 615-616 [1 ref.]

Lambert found a paralytic deliberately infected with malaria who showed no fever in spite of numerous plasmodia. Injection of peptone and of milk did produce rise in temperature. Accordingly so it is argued malaria would have affected the same result did the matter of protein shock enter into its causation

C. L.

ST JOHN (J. H.) The Gametocytes of Tertian Malaria and their Early Appearance in Malaria transmitted by *Anopheles punctipennis* —Amer. J. Trop. Med. 1928. July Vol. 8 No 4 pp 305-323. With 3 charts & 8 figs. on 1 plate [5 refs.] [Army Med. School, Washington D.C.]

In injected malaria, gametocytes may be present even on the first day of fever. *A. punctipennis* has been infected as early as the 4th day in mosquito-induced malaria. The average number of gametocytes to schizonts was 1 to 22 and of males to females 1 to 3.4

C. L.

PIRES (Waldemiro) & PÓVOA (Hélion) A função reactivadora da malaria (Nota previa) [Reactivating Function of Malaria.] —Arch. Brasileiros de Med. 1928 Aug Vol 18 No 8 pp 717-722 also in Brasil Medico 1928 Sept. 8 Vol 42. No 36 pp 1003-1006

The authors give information upon ten cases comprising tabes, cerebral syphilis, endarteritis, epilepsy and optic atrophy in which the spinal fluid obtained either by lumbar puncture or by that of the cisterna magna, was negative to the Wassermann test. After therapeutic infection with malaria it became strongly positive in all instances without clinical benefit.

C. L.

WATSON (Malcolm) Twenty Five Years of Malaria Control.—Malayan Med. J. 1928 Mar Vol. 3 No 1 pp 7-10

The witless may prefer *Hamlet* without Hamlet yet remembering always that the name part is here cut out there is joy to be got from the vivid descriptions contained in this paper of the acting of others in the play. When first announced in 1898 Ronald Ross's discovery was treated by the world with undisguised incredulity when confirmed it was said to be interesting but valueless. The honour of being the first in the Empire and perhaps in the world to use it successfully belongs to the Government of the Federated Malay States. Malaria

control by drainage was begun early in 1901 and before long the towns of Klang and Port Swettenham were completely freed from the disease. Then came the larger problem of rural malaria. In 1905 the F.M.S. Government gave \$110,000 to drain the Kapar District. Again success came quickly. But in the Malayan Hills with their swiftly running streams there was failure and no help from outside since malaria was absent from the hills of Italy where such advances were being accomplished. Ten years after Ross's discovery the situation was grave: attempt at control had been abandoned in W. Africa in 1901, the idea had been unsparingly disowned with condemnation of mosquito control in India in 1909. In 1911 subsoil drainage, the putting of stream under ground, was started in Malaya and Singapore. In 1914 it was discovered in Malaya that mixed unpoisoned, kerosene and crude oil completely destroyed larvae in running streams. In that year the STRAITS TIMES showed in Malaya that *Anopheles umbrosus*, the pest of high water on the plain, did not breed in the hills, nor did any other anopheline. A long campaign was maintained, a demonstration of the biological method of control, in every sense of the word without parallel. SCHIFFNER and SWELLENGREBEL carried to the Dutch East Indies the species sanitation as they named it, the destroying of all species considered as dangerous and the neglecting of others. In 1916 the International Health Commission of the Rockefeller Foundation built a Research Laboratory under Malcolm Watson at Klang and from there species control spread to the United States and Panama. In Georgia, after 9 years careful work, the Rockefeller Foundation is employing the methods which have commended themselves to workers in Malaya for many years while one reads in the reports of the Rockefeller Foundation of its pioneer work in malaria control beginning in 1916. The future is envisaged thus: "The whole object of the mosquito research of to-day should be the understanding and application of biological methods of control. I can look forward to the time when we shall be able to play with species of anophelines as to some *Go* and to the other *Comes* and abolish malaria as high at ease perhaps at hardly any expense."

C. L.

RENNETT (J. M.). *Guide for Government Officials, Estate Managers, etc. in treating Malaria Problems.* — *Medica Dienst d. Nederl. Indis* 1928 Vol. 17 Pt. 1 pp. 63-79.

This note is delightfully clear and reasonable and explains how increasing knowledge justifies changing and even contradictory advice. It has points of principle of general value. No anopheline larva can survive in the tide so that all pools where this is free do not breed them. Such are the virgin tide forests since in them stagnant pools are not possible. Influence of tide and current produce local sand bars across rivers especially in bays. These bars are at least for most of the year complete and unbreached, and here a larval barrier still must never be made near such places. The knowledge of this for commercial success much vegetation, so that rivers are not traversed in them. There should be no such pond within 4 km. of human settlements. Running water breeding larvae must be avoided. Houses built 500 metres from water supply bringing the necessary water should be

healthy The Malay experience shows the risk of clearing ground unless sure of the local vector and the point is emphasized by reference to the doubt as to whether the sun-seeking *A. maculatus* or the shade-loving *A. umbrosus* is concerned at Tandjong Pinang The former being now condemned no tree is to be cut down without urgent need The prophylactic and therapeutic uses of quinine are explained

C L.

SCHARFF (J W) Notes on Practical Measures of Malaria Prevention from the Point of View of Mosquito Control.—*Malayan Med J* 1927 June Vol 2 No 2. pp 49-53

This paper read at the annual meeting of the Malaya Branch of the B.M.A. deals with matters of wide interest In spite of publicity by lectures free distribution of quinine at police stations did not appeal to the public, which is perhaps not unnatural Instances of the actual costs of oiling and drainage are the following Oiling a ravine \$324 yearly installing subsoil drainage \$1 549 estimated upkeep \$46 5 annually Oiling a ravine and swamp \$234 annually installing subsoil drainage \$674 value of 105 rubber trees felled or requiring felling \$525 annual upkeep \$21 In general the cost of drainage is 3 to 5 times the annual cost of oiling while security against breeding is much enhanced The standard mixture for oiling consists of solar oil 50 kerosene 4 crude oil 10 and is considered the most efficient antilarval oil at present available A new syphon drip can is described in which the pressure is constant being caused by the syphon and does not alter with the varying height or head of water in the upper tank In practice 4 gallons of oil last for 12 days and once set the drip is perfectly regular In nature *A. ludlowi* often lives in close association with fish which have a splendid laboratory capacity for these larvae.

C L.

COOGLE (C. P) Preliminary Report of Screening Studies in Leflore County Miss.—*Public Health Rep* 1927 Apr 22 Vol 42. No 16 pp 1101-1112. With 1 map & 1 fig in text & 2 plates.

Coogle reports experiments in screening farm tenant houses which have continued since 1924 He started handicapped with a belief prevalent among farmers that it had proved inefficient He has found 8 times as many *A. quadrimaculatus* in unscreened as in screened houses, and a malaria rate in the latter 29 per cent of that in the former As the result of his experience he asks and answers a number of questions He believes that practically all habitable tenant houses can be screened that tenants want screens an answer based on a shrewd offer by a planter that tenants particularly coloured ones use their screens with reasonable care and can with patience be taught to distinguish effective from ineffective methods No 16 mesh galvanized wire is advised, the total cost of application has been reduced by experience to under \$9 a house, and the gauze has lasted through the 3 years of the experiment and is likely to last at least one more Whether screening comes into wide use will depend, it is felt on whether increasing scarcity of labour will make sickness among tenants a crucial economic factor in causing shortness of labour at critical times

C L.

VALLI (Vittorio) Relazione della campagna antimalarica 1926-1927 (Report on the Antimalarial Campaign, 1926-27).—*Riv di Malarologia* 1928. Mar-Apr. Vol. 7 No. 2 pp 104-140. With 7 figs. (2 maps). English summary p 214. [Istituto Autonomo per la lotta contro la malaria. Venezia.]

Valli is of opinion that Paris green is not economically practicable since it does not kill the first larval stages and since its action lasts only 5 to 6 days. *Gambusia* is held to destroy locally only 20 per cent. of larvae vegetation interfering with its action. *Immunus nebulosus* destroys all other fish including *Gambusia* by means of its venomous fins. Two cases of fatal tetanus are reported after injections of methyurethanequime infection not apparently being conveyed through solution or vials which if true would imply that no precautions can prevent this tragedy after quinine injection. A horse had died from tetanus a few days before close to the dwelling of these women.

C. L.

PECORI (G.) & E-CALAR (G.) Relazione sulla campagna antimalarica dell'anno 1927 (Report on the Antimalarial Campaign of the "Governatorato" of Rome in 1927).—*Riv di Malarologia* 1928. May-June. Vol. 7 No. 3 pp 217-266. With 1 map & 3 text figs. English summary pp 404-405. (Hygiene Office, Governatorato of Rome.)

The autumn mainly of local interest. Quinine prophylaxis was applied in 1,668 cases and only 1.6 per cent had fever attacks. Localities not aided by antilarval measures (Paris green and oil) showed few winter adult mosquitoes and a lowered malaria incidence. Zooprophylaxis seemed to be without effect.

C. L.

MISIRILI (A.) La prevenzione della malaria nel campo pratico. II. Relazione (Prevention of Malaria in Practice. 2nd Report).—*Riv di Malarologia* 1928. July-Aug. Vol. 7 No. 4 pp 413-455. With 17 graphs & 2 figs. [English summary p. 626.]

The author summarizes the investigations carried out by the "Stazione Sperimentale per la malaria antimalarica" in the third year of its activity. He treats the questions of the relationship between artificial ponds and malaria the practical limits of small sanitation improvements and further quinization with respect to eradication of malaria.

He also examines the measures of the incidence of this disease particularly the place and parasite rates and the correlation between malaria morbidity and the surrounding temperature.

He concludes that a real access in human *bon fectum* is to be gained on the whole only by preventing man from new infections.

C. L.

CLUZEL Une visite à la station expérimentale antimalarique de Porto-Torrès (Sardaigne) (emploi du vert de Paris pour la destruction des larves d'anophèles) (Employment of Paris Green at the Antimalarial Station of Porto-Torrès, Sardinia).—*Arch Med Pharm* Nov. 1927. Apr-Mar-June. Vol. 117 No. 2 pp 141-153.

Cluzel, after a course at Paris under BRumpt studied the malaria situation at Porto-Torrès in the north-west of Sardinia. He has been

much impressed with the value of Paris green used in the usual 1 per cent dilution every 8 days on the sluggish river Turitano which runs through the town. This has an infection rate of 60 per cent of its 6 000 inhabitants. Anopheles have almost completely disappeared and only 7 new cases of malaria were registered during the summer months. Larvae still swarm beyond the 6 mile stretch where Paris green was employed.

C. L.

GARTON (W. M.) *The Control of Malaria and Mosquito Breeding at the Marine Barracks, Quantico Va., during the Year 1927*—*U.S. Nav. Med. Bull.* 1928. July Vol. 26 No 3 p 747-754

Some of this work has been described elsewhere. Of Quantico village the old inhabitants say that it is the worst hole for malaria in the Potomac. Admissions to hospital for this disease have fallen from 28.26 per mille in 1922 to 0 in 1927. Apart from Paris green application, oiling has been employed with 1 part used crank-case oil to 5 parts kerosene, 1 per cent of castor oil being added. Used crank-case oil has little tendency to form a good film.

C. L.

DE BOER (H. S.) *Malaria and its Control on Mombasa Island.*—*Kenya & East African Med. J.* 1928. Apr Vol. 5 No 1 pp 2-11. With 1 folding map.

The anopheles found breeding in Mombasa were *A. costalis*, *A. mauritanicus* and *A. cinereus*, the last two on very few occasions only. The breeding places were temporary, in pools during the rains and permanent or semi permanent, the numbers of these sources accounting sufficiently for those of adult insects. The aim was to prevent the hatching out of adults in the dry season so that there should be none to breed during the rains. It was attained partly by draining or filling and partly by oiling. Before the rains of 1927 four months had passed without an anopheles larva being collected on the island by gangs which had previously brought in many, while during the long rainy season only two anopheles were caught by a skilled collector. Unfortunately the yearly deaths from 1924 labelled as malaria have been 74, 93, 84 and 101 respectively. Malaria in most tropical countries is undoubtedly the rubbish heap of diagnoses.

C. L.

MARTINI (E.) *Malaria und Malaria bekämpfung in der Türkei* [*Anti-Malarial Measures in Turkey*].—*Seuchenerkämpfung* Vienna. 1928. Vol. 5 Nos 1 & 2 pp 6-11, 101-104. [Inst. for Ship & Trop. Diseases Hamburg.]

Martini has been doing antimalarial work in Anatolia, in different parts of which the climate varies greatly in moisture and temperature. The mosquitoes are as follows. In open country, breeding in mountain streams *A. superpictus*; in flat country *A. elutus* where it is warm and *A. maculipennis* where cooler. In the shade *A. bifurcatus* and *A. algeriensis*. In rice-fields *A. sinensis* or *A. elutus*. Irrigation is practised for some gardens, so that some of the malaria is probably man made.

All children get fever. The basis for a campaign carried out in 1928 is summarized under 31 head. It has cost £172,680 for a population of 30 000 persons but malaria, it is claimed, has been rendered negligible.

C. L.

UNITED STATES NAVAL MEDICAL BULLETIN 1928 July Vol. 28.
No. 3 pp 754-760 1 ref.—Mosquito Control on the Isthmus of Panama.

Certain paragraphs from the report of the health department of the Panama Canal for 1926 are reproduced. As already noted, this was the year with the lowest malaria record the cumulative result of combined work. The Malaya absorption drainage system has been adopted in certain parts. Larc green is believed to have little local value. It is dearer than oil and requires dry conditions for the distributing of the diluting dust and in order that the powder shall not stick to vegetation such climatic conditions are largely absent locally. Malaria mosquitoes are rarely caught within town limits, but *Aedes taeniorhynchus* and *Mansonia titillans* have enormous breeding grounds in Gatun Lake and in coastal swamps. The flight range of the former is put at 40 miles.

C. L.

FEDERATED MALAY STATES Annual Report of the Malaria Advisory Board for the Year 1927. HOFER (J. W.)—19 pp 1928. Kuala Lumpur.

The report records the steady antimalarial work which is being carried out in Malaya. A Chinese lecturer has been attempting to interest school children in the subject, and has encouraged and answered questions thus—

Q. Why should we call mosquitoes dangerous? They do no violence to the law of their peculiar instincts.

A. Because infected mosquitoes cause an attack of malaria which may result in death. From the law point of view manslaughter should be brought to justice.

C. L.

RUSSIAN SOCIALIST FEDERAL SOVIET REPUBLIC. People's Commissariat of Health. Travaux de la Conférence sur l'œuvre antipaludique parmi les ouvriers des exploitations tourbières 11-13 Février 1928. [Antimalarial Work amongst Peat-Bog Workers.] In French pp 123-128. [In Russian.]

The last conference on antimalarial work among peat-bog workers took place in 1928. The present one notes the improvement which has since occurred. In view of the degree of malaria still present it is advised that anti-malarial work must not only continue but be extended in scope with co-ordination of the various organizations, medical and agricultural, concerned with facilities for medical transport and extension of antimalarial measures to the isolated peat-bog worker.

It is proposed that a permanent staff should replace the temporary one that the temporary workers should be engaged for at least six months, that the conditions of life for the staff medical and lay should

be improved, and that their work should include prevention as well as cure should comprise research and the work of sanitary education and should extend to the whole population. An entomological section should be added to antimalarial stations

C. L.

KADANER (M) Grossesse malaria et quinine Notes de pathologie tropicale [*Pregnancy, Malaria and Quinine in the Tropics.*]—*Ann Soc Belge de Méd Trop* 1928 June Vol. 8 No 1 pp 59-64

Three cases of abortion are described in women who had neglected prophylactic quinine Observations on 100 pregnancies among Europeans form the basis of the writer's conclusion that in a country so malarious as the Congo a prophylactic dose of quinine of 0.3 to 0.5 gm. daily is essential to prevent abortion Pregnancy is not shortened thereby He holds a malaria attack more likely to produce miscarriage than quinine Taken post partum in double the doses mentioned the drug gives a straightforward puerperium Only in 3 to 5 per cent of women is menstruation rendered excessive by quinine [*cf* HEWETSON this *Bulletin* Vol. 25 p 570]

C. L.

HOLMES (M. J.) Control of Malaria and Bilharziosis introduced into Australia by Returned Soldiers and Sailors—*Health Melbourne* 1928 May Vol 6 No 3 pp 70-75

The report on malaria covers the years 1919-22. Great care has been taken to keep in touch with malaria infected ex-soldiers and ex-sailors. No local epidemic focus of malaria has become established in Australia as the result of the return of many thousands of infected men

C. L.

AMERICAN JOURNAL OF PUBLIC HEALTH 1928 Aug Vol 18 No. 8 pp 885-992.—Advancement in Mosquito Control in the United States and Canada. [JACKSON (L. E.) VAN HOUTENBERG (H. W.) FILBY (E. L.) GREEN (F. W.) & CLARKE (J. L.)]

A questionnaire has elucidated the states and provinces where control is or is not being carried out or is judged unnecessary. A mosquitophobe opinion is being fostered

C. L.

BEJARANO (Jorge) REY (Gabriel Vergara) & ARADIA (G.) La lutte anti paludéenne en Italie.—*Ann d'Hyg Pub Indust et Sociale* 1928 May Vol. 4 No 5 pp 263-276

BOGOTAVLETSKY (N. A.) & YAMPOLSKAYA (F. S.) Quelques observations à propos du tableau parasitaire du sang des impaludés.—*Russian J Trop Med* 1928 Vol. 6 No. 5 pp 287-289 [5 refs.] [In Russian]

DE BUEN (Sadi) La plasmoguina en el tratamiento del paludismo (Estado actual)—*Med Paises Calidos* Madrid. 1928. Jan. Vol. 1 No. 1 pp 28-38 [18 refs.]

CALDERÓN BLANCO (Sebastián) El tratamiento moderno del paludismo—*Siglo Méd* 1928 July 7 Year 75 Vol. 82 No. 3891 pp 5-8. With 4 charts in text. [Med. Clinic Faculty of Med. Madrid]

CLARK (Oscar) A quinidina, o ferro e a malarina no tratamento do impaludismo—*Folia Med* 1928 July 15 Vol. 9 No 20 pp 234-236

- CORRY (Kenneth) Antimalaria Work at Masekar Egypt, in 1925 and 1928 and the Results compared with the Previous Two Years—*Jl. Roy Army Med Corps* 1927 July Vol 49 No 1 pp 14-26 With 1 plan & 1 chart in text. [7 refs]
- FERRI (Clemente) I mghi artificiali la malaria—*Univ. Med.* 1928 July 13. pp 25-28. [Hyg Inst Lun Sasan]
- GOTIA MORALES (Eduardo) Paludismo experimental—*Med. Paises Cálidos.* Madrid 1928 July Vol 1 No 4 pp 309-313. With 24 charts. [17 refs] French summary p 313.
- GUTTARE (A) Gertacion y paludismo—*Seminario Med* 1928 July 28. Vol 35 No 30 pp 21-23 1st refs
- HARADOFF (T G) Considerations sur la lutte antipaludique dans les pays du Transcaucasie—*Reu. de T p Med* 1928 Vol 6 No 5 pp 306-321 In Russ
- KOLMAKOW (A S) Zur Frage ueber die Stabilität des Malaria Plasmodiums wie die Ursache der wiederholten Erkrankungen an Malaria—*Russk. JI T p U d* 1928 Vol 6 No German summary p 141 [In Russian pp 87-88]
- MATJUSCHENKA (B) Ist Malaria ein Keimruft?—*J. Sov. Hyg u Desinf.* 1927 Sept Vol No 6 pp 545-548 18 refs
- MAYNE (Bruce) A Note on Some Recent Attempts to transmit Malaria Organisms mechanically through Mosquito Biting—*Indian JI M d R* 1928 Apr Vol 15 No 4 pp 1067-1071 With 1 plat 5 refs
- The Infec of R latu Humidit on the Presence of Parasites in the Insect Carrier and the Initial Seasonal Appearance of Malaria in a Selected Area in India—*Indian JI U d R* 1928 Apr Vol 15 No 4 pp 1073-1084 With 1 chart in Text 12 refs
- MAZ (Salvador) & TRILLA (Rogelio) Ensayo de tratamiento del paludismo por compresión de extracto de corteza de quebracho blanco—*Prensa U d* 1928 Sept 10 Vol 15 No 10 pp 441-443
- MORIN (Henri) (S) Le paludisme dans la province Mo de hontum en 1926—*J. J d P med Indochine* 1928 Apr No 7 pp 61-74 With 8 figs & 4 plates See this Bulletin Vol 5 p 533
- PETERSON (A R) Notes on the Organization and Scope of Certain Anti Malaria Work in the Federated Malay States with Special Reference to the Control of Malaria in the Capital Town of Kuala Lumpur by Means of Permanent Drainage—*Africa & East African Med JI* 1928 July Vol 3 No 4 pp 11-131 [7 refs]
- RAON (A S) An interesting Case of Malaria—*Indian M d Gaz.* 1928 June Vol 63 No 6 p 336
- ROSS (Ronald) Malaria Control in Malaya and Amazo A Visit of Inspection 1928—*Malaya Med JI* 1928 Mar Vol 2 No 1 pp 40-53. See this Bulletin Vol 5 p 119
- TROON (G) in collaboration with FROSTVILLE (T) & WILLIAMS (L) Index Bibliografico della Malaria, 1928—*Supplemento to R di Malariologia* 1928 Vol 7 Nos 2 & 4 pp 1-36 37-80
- VALDÉS LAMERA (Joaquín) Intervención inusual del factor palúdico en la historia d una tuberculosis asociada al tratamiento antituberculoso—*Med. Paises Cálidos* Madrid 1928 Sept Vol 1 No 5 pp 440-445 With 4 figs
- WILSON (P W) Notes on a Malaria Survey at Port de Paz, Haiti—*J. S. Am. U d Bull* 1928 Apr Vol 28 No 1 pp 320-323 With 4 figs on plates

DENGUE AND PAPPATACI FEVERS

KAMAL (H) *The 1927 Epidemic of Dengue in Egypt.*—*Brit Med J* 1928 June 30 pp 1104-1106 With 9 charts. [2 refs.]

This is a careful clinical description of cases of dengue occurring in Egypt during an epidemic in that country in 1927. Examples of temperature charts are given and these demonstrate that the following types of pyrexia were noted —

- 1 Abortive type in which the fever lasted for one to three days
- 2 Intermittent type in which the fever usually lasted for seven days the intermissions were sometimes separated by an interval of from one to two days.
- 3 Saddle-back type or remittent temperature
- 4 Continuous type with febrile plateau
- 5 Long type in which the fever continued for ten to fifteen days

The characters and distribution of the rash are carefully described and the differential diagnosis of the disease is fully discussed

D Harvey

SCHMOURLO (S) *Au sujet de la dengue au Soudan (Dengue in the French Soudan).*—*Bull Soc Path Exot* 1928 July 11 Vol. 21 No 7 pp 577-583 [15 refs]

The author agrees with LEGENDRE that dengue is widespread not only in French West Africa but also in the French Soudan where he was stationed on his first colonial tour. He encountered four typical cases within a week of his arrival at his station the patients being his wife his two sons and himself. He has also seen typical cases in other Europeans in the district and four cases in natives in his dispensary five other natives who had to be admitted to the same room went down with the disease in the course of a week. He explains that the dispensary is only a thatched building and was humming with mosquitoes. In his opinion *Fièvre Rouge* of LEFROU is only mild dengue [see this *Bulletin* Vol 25 p 529]

D H

PERVÈS. *Epidémie de dengue au centre de la marine de Dakar (Epidemic of Dengue at the Naval Station at Dakar)*—*Arch Méd et Pharm Nav* 1928 Apr-May-June Vol 118 No 2 pp 166-175 [5 refs.]

This epidemic the third known to the author commenced on August 30th, 1927 and ended in October. 105 men out of 525 were attacked, and there were mild cases who did not report sick. The local natives also suffered. Only a short stay in hospital was necessitated average 4-5 days. Symptoms—nothing remarkable. In several cases the eruption appeared with the initial fever and also again with the relapse. Only 1 death occurred and this was in a chronic alcoholic with cirrhosis of liver and kidney and fatty heart. The differential diagnosis is discussed especially as regards yellow fever and malaria. Prophylaxis—destruction of mosquitoes and protection of the men

from bites. Mosquito nets are not of much avail as *A. aegypti* bites during the afternoon when the men are up and about. The author found no spirochaetes in any of his cases.

Treatment—arsurin and quinine. Arsenicals such as acetylarsan apparently had the effect of stopping the fever and preventing relapse and should be given a trial in all cases.

D. H.

COPADARIS (Ph). Sur la recente épidémie de dengue en Grèce [Recent Epidemic of Dengue in Greece.]—*Bull. Office Internat. d'Hyg. Publique* 1928 June Vol 20 No 6. pp 899-901

Dengue has been imported into Greece from Tripoli, Egypt and Syria. There was a severe epidemic in Crete in 1881 when half the inhabitants contracted the disease. In 1899 an epidemic occurred in Athens followed, in 1895 by another outbreak, and again in 1910. Finally dengue broke out in Athens in September 1927 and continued till January of the present year. During this period about 20,000 persons were attacked.

There was nothing unusual in the clinical symptoms. Cases were occasionally noted in which there was congestion of the soft palate and enlargement of cervical glands. There was a constant leucopenia and a trace of albumin in the urine. Only a few cases were fatal and these were in aged or debilitated persons.

The search at the Greek Pasteur Institute for the spirochaete described by COFFA was without positive result. All cultures and animal inoculations were negative. *Stegomyia* was present in large numbers but *phlebotomus* was rare. The disease died down and disappeared when this particular mosquito disappeared or became few in numbers. In one province—the most southerly—cases of sand fly fever and dengue occurred at the same time.

D. H.

FERGUSON (E. W.). Dengue Fever—the 1925-26 Outbreak in New South Wales.—*Rep. of Director General of Public Health New South Wales for Year 1926* pp 154-164. With 1 folding map.

A record of previous outbreaks in Australia is given and it is noted that there have been five great epidemic waves of dengue at approximately ten year interval. In New South Wales dengue was epidemic in 1888, 1906, 1916 and 1926. It is suggested that this period is determined by the changes in population and the disappearance of the immunity produced by previous outbreaks. The seasonal prevalence of the disease is accounted for by the changes in climate which determine the presence or absence of the insect vector.

In 1925-1926 the disease extended as far south as Newcastle and it was observed that not only was the disease not confined to the coastal area but that the inland towns of the more northern and therefore more tropical areas were most heavily infected, isolated farms and stations escaping or being but slightly affected. Dr. Ferguson is of opinion that infection was derived directly from Queensland since the disease started on the border and spread southwards into New South Wales. As in 1916 when CLELAND showed that *Aedes aegypti* Lin. was the vector so in this epidemic it was clearly shown

that the distribution of cases of dengue was closely related and indeed similar to the distribution of this mosquito. There is some evidence to show that it has extended its spread recently further inland both in Queensland and New South Wales. There was nothing new or remarkable in the symptomatology of the disease and in the experience of the author the rashes were ephemeral or appeared as a dull mottling under the skin.

The remainder of the communication consists of reports of departmental officers

D H

CALVO CRIADO (V) La actual epidemia de dengue en Andalucía [The Epidemic of Dengue in Andalusia].—*Medicina Países Cálidos* Madrid 1928 May Vol 1 No 3 pp 250-257

CASTEJON (Rafael) La epidemia del colorado en Andalucía [The "Colorado" Epidemic in Andalusia].—*Ibid* pp 258-260

These papers refer to the same outbreak. The first case was a mild one the initial symptoms and early rash were typical but the patient felt so much better at the end of three or four days that he would not remain in hospital. Owing to the character of the eruption the condition believed to be new was designated colorado [the blush]*. The number of cases mounted rapidly and a fairly extensive epidemic resulted. The subsequent cases were 'text book' instances and there was no doubt of the disease being dengue.

H Harold Scott

MANOUSSAKIS (E) Recherches étiologiques sur la dengue. [Researches on the Etiology of Dengue].—*Bull Soc Path Exot* 1928. Mar 14 Vol 21 No 3 pp 200-205 [4 refs. (Military Instructional Hosp & Pasteur Inst Athens)]

The author carried out some work on the experimental production of dengue in volunteers. He remarked that the disease produced experimentally was exactly similar in its clinical manifestations to the natural disease sudden onset aches and pains, especially in the lower limbs supra-orbital headache loss of appetite and fever with a rubelliform rash remission after two or three days followed by a recurrence of symptoms. An interesting point was that all the cases of experimental dengue were typical cases of that disease and left no sequelae. After a great number of passages there was apparently no increase or decrease of the virulence of the organism. The incubation period varied from 5 to 7 days and was symptomless.

The technique employed in the experiments was as follows —

Twenty five cc. of blood were taken from a case of dengue in the first twenty four hours of the disease and placed in 200 cc. of normal saline sealed up and placed in the incubator. Six cc. of the supernatant fluid after six days incubation was injected subcutaneously into a volunteer and gave rise to the disease. The strain was then carried from volunteer to volunteer by subcutaneous injection of 2 cc. of serum.

The author carefully examined the blood of the volunteers every 12 hours from the second day of incubation to the termination of the fever and failed completely to find any trace of the spirochaete described

* STICKER gives Colorado as the common name for dengue in the Spanish American colonies. (Mense & "Handbuch.")—ED

by COUVA and by GOMEZ. No other organism of any kind or shape could be found. All attempts at culture also failed to demonstrate a spirochaete or other organism. On the other hand he was able to transmit the fever after filtration of the serum through Chamberland candle, L7 and L11 and the fever thus produced was identical with the natural disease and with that produced by injection of the unfiltered serum. Heating to 50° C for half an-hour destroyed the pathogenic property of the serum but heating to 40° C did not destroy this power. The virus was not destroyed by exposure to sunlight for half an-hour. If kept for seven days at 37° C or 8 days at room temperature the pathogenic and antigenic powers of the virus were lost. That this was so was demonstrated by the fact that volunteers who had been inoculated with the old virus reacted when inoculated later with fresh virus.

Guinea pigs inoculated with three times the dose given to the volunteers showed no reaction whatever.

It was found that the serum was not infective during the incubation period and did not become so until a few hours before the fever commenced. It continued to be infective throughout the fever. Throat washings and filtered urine were found to be non-infective.

It was not found possible to infect volunteers by the mouth although in two cases repeated application of the serum of patients to the nasal mucous membrane of volunteers produced the disease.

A study was made of the immunity to the disease and it was found that persons who had recently up to two months, had an attack were resistant to doses of infective serum. But the serum of these convalescents did not confer immunity on susceptible volunteers, whether the dose of serum was injected before at the time or after the infecting dose.

D H

BLANC (Georges) CAMINOPELOS (J) & MANOUSSAKIS (E.) Quelques recherches expérimentales sur la dengue. [Experimental Work on Dengue. — *Bull Soc Path. Exot* 1928. July 11 Vol. 21 No 7 pp 525-537 With 6 text figs. 71 refs.] [Pasteur Inst Athens]

The recent severe epidemic of dengue in Greece has given the opportunity of carrying out a research on the transmission of dengue from man to man and to experimental animals. The work was done in the winter and spring when *stegomyia* were not present and cases of dengue were not occurring. The authors confirmed the previous work in that they were able to infect human volunteers by means of blood taken from cases in the first 24 hours of the disease. The result was the same whether whole blood, serum, or diluted and filtered serum was used. But in addition they showed that if the serum be stored at room temperature in sterile flasks it remains infective for a period up to two months. Three cc diluted and filtered and injected into the vein of a volunteer produced a typical attack of dengue after an incubation period of four days although 54 days had elapsed since it was taken from the donor.

In one or two cases it was noted that if two or more volunteers were injected with infective blood, one of them might show no reaction, yet if the blood of this person was taken four days later it would prove infective for a susceptible volunteer—"Dengue inapparent, cryptic dengue," symptomless dengue. That this is not merely due to the

presence of the virus carried over from the first case was shown by the fact that blood taken from the symptomless case before or after the 4th to 6th day after inoculation was non infective i.e. there must have been multiplication of the virus.

With regard to experimental animals the following were inoculated with doses of infective serum monkey dog pigeon fowl white rat rabbit guineapig and in none was any febrile or other reaction noted yet in two cases serum taken from guineapigs on or about the fourth day after inoculation produced typical attacks of dengue in human volunteers after an incubation period of 4 days but the infection could not be carried on to other guineapigs in series i.e. the blood serum of a second guineapig did not produce an attack of dengue when inoculated into a human volunteer although the serum of the first had done so

D H

SCHULE (Paul A) *Dengue Fever Transmission by Aedes aegypti* — *Amer Jl Trop Med* 1928 May Vol 8 No 3 pp 203-213 [6 refs.] [U S Army Med Dept Research Board & the Bureau of Science Manila P I]

The author gives a short historical account of the transmission of dengue by the mosquito *Aedes aegypti* and notes that in previous work already reported in this *Bulletin* it was found that mosquitoes fed on cases of dengue did not become infective for susceptible people until an interval of eleven days had elapsed since the infecting feed

The author using the same room in the hospital at Manila in which some of the previous experiments had been carried out by SILER and others [see this *Bulletin* Vol 22 p 943; Vol 23 p 360 734] repeated these experiments and was able to show that the period between the infecting feed and the successful transmission of the disease may be as short as eight days He explains the discrepancy on the ground of differences of temperature During the period covered by his experiments the temperature of the air was considerably higher than it was in previous experiments and as he points out this phenomenon of increased rate of development of a protozoal parasite in the insect host at a certain optimum temperature has been already proved in the case of the development of trypanosomes

Another interesting point brought out was that certain of his volunteers, who were all American soldiers proved to be immune these immunes were all men who had either been residents for a considerable period in the country or in the case of those who had not been for a long time in the country were men who had been in parts where dengue was prevalent

D H

SELLARDS (Andrew Watson) & SILER (Joseph F) *The Occurrence of Rickettsia in Mosquitoes (Aedes aegypti) infected with the Virus of Dengue Fever* — *Amer Jl Trop Med* 1928 July Vol 8 No 4 pp 299-304 With 4 figs. [4 refs.] [Harvard Med. School, Boston, Mass. & Bureau of Sci & Med Dept Research Board, U S Army Manila Philippine Is]

The number of mosquitoes used in a transmission experiment was gradually reduced until only two were left these two were allowed

to bite a volunteer and a typical attack of dengue resulted. They were then killed and examined for micro-organisms and this was controlled by observations on the laboratory stock of normal mosquitoes which had been proved to be non-infective. Sections of mosquitoes were cut serially and stained by Giemsa's stain which gave the best results. The viscera of infected mosquitoes were also smeared on slides and stained and Rickettsia like organisms were found with frequency by this method.

Unfortunately, in the control mosquitoes a protozoan parasite (unidentified, but resembling *Leukostoma culicis*) appeared which at certain stages of its development might conceivably be confused with Rickettsia. Sections were made of 24 control mosquitoes and 16 mosquitoes from lots known to have caused infection. In about half of the dengue-infected mosquitoes masses of Rickettsia bodies were found quite unlike anything found in the control mosquitoes. They occurred in masses in the lining of the gut, and in smaller numbers were seen lying within the epithelial cells lining the gut none were found in the salivary glands or in any other tissues outside the alimentary tract. The two mosquitoes referred to at the beginning of the paper were sectioned one was negative but the other showed typical Rickettsia.

In view of the infection of the control mosquitoes with the protozoan parasite the authors are not prepared to lay too much stress on these findings but as a stock of mosquitoes has now been obtained free from this organism they propose repeating this investigation.

D H

KRAUS (R) Ueber Dengue [Dengue]—*Monatsschr. Klin. Woch.* 1928. Sept 27 Vol 41 No 36 pp 1371-1372.

The author in the Argentine had a large experience of dengue fever during the big epidemic in 1916 in that country. He is now at home in Austria, and in view of the prevailing epidemic of dengue in Greece and Southern Europe he gives a full clinical, pathological and etiological account of the disease so that should cases occur they may at once be recognized.

D H

1. KLIGLER (I J) Studies on the Etiology of Phlebotomus and Dengue Fever. I. Introduction.—*Ann Trop Med & Parasit* 1928 Aug 28 Vol 22 No. 2 pp 143-150 [11 refs.] Dept Hyg Hebrew Univ Jerusalem
2. — & ASHNER (M) II. Is a *Leptospira* the Causative Virus?—*Ibid* pp 151-159 12 refs.

1. The author considers that Palestine is a country where sand-fly fever and dengue can be conveniently investigated. Sand fly fever is endemic in Palestine whereas dengue is not and the former disease is strictly limited in its occurrence to the months from May to October when the fly is present whereas a sharp outbreak of dengue which occurred in 1927 broke out on October 20th, after the sand fly fever season was over and continued for two months. Although there

is a similarity between these two diseases there are some points by which they can be clearly differentiated sand fly fever lasts for 3 days dengue for 6 to 7 days never less than 6 and the disease is as a rule, more severe than sand fly fever and a rash appears about the 4th day.

Both have been shown to be due to a filterable virus DOERR 1909 Ashburn 1907 and the author has succeeded in repeating this observation for both diseases in Palestine. Also in both diseases it has been stated that a *Leptospira* has been isolated from the blood (COUVA-WHITTINGHAM) and with a view to confirming or refuting this the author carried out a very careful and elaborate research which is recorded in the second paper.

It may be said that already over a period of five years the author has examined the blood of some 40 cases of sand fly fever taken in the first 24 hours of the disease by direct examination by cultural methods and by animal experiments and all with negative results as regards the detection of *Leptospira*.

ii. Before embarking on a further investigation of the blood of actual cases of sandfly fever and dengue the authors studied the physical biochemical and biological properties of various species of *Leptospira* and also tried various methods of isolating these organisms by culture and they adopted a method which in their hands gave the best results. Having satisfied themselves by means of this preliminary work that they were well equipped for the detection of the parasite in actual cases they proceeded to examine 16 cases of phlebotomus fever and 9 of dengue. The blood was taken in the first 24 hours of the disease cultures were made in Noguchi's medium in Locke's solution and on glucose-agar semi solid + 10 per cent rabbit's blood. Direct examinations were made of the blood by dark ground illumination and by various staining methods. Finally the supernatant fluid was subjected to fractional centrifugation and again examined and guinea-pigs were inoculated from the sediment and from the blood. Both aerobic and anaerobic cultures were made and incubated at 30° C. The result of all this work was entirely negative so far as the discovery of *Leptospira* is concerned.

Some thousands of sand flies taken in places where cases had occurred were sterilized washed and triturated and examined by culture by microscope and by animal inoculation, and all were negative for *leptospira*. It was also found that *leptospira* only survived for about 36 hours in artificially infected sand flies or *stegomyia*. As a result of their work the authors are convinced that the virus neither of sand fly fever nor of dengue is a *leptospira*.

D H

GRIDNEV (V. M.) A propos d'une épidémie de fièvre à papatasi à Tiflis [Epidemic of Pappataci Fever in Tiflis.]—*Russian Jl Trop Med* 1928 Vol 6 No 1 French summary p 69 [In Russian pp 3-9 With 1 chart in text. 9 refs.] [Trop Inst. Tiflis.]

This paper records the occurrence of an epidemic of sand fly fever among the soldiers of the garrison of Tiflis. As a result of this discovery cases were also found in the civil population. Sand fly fever in the opinion of the writer is no new thing in Tiflis but has previously been confused with influenza and other short fevers. Sand flies appear in June and disappear in August and this is the season of the fever.

D H

- i. NOWLAND (Reg. E.) Unusual Case of Dengue Fever.—*Med. Jl. Australia* 1928 Aug 4 15th Year Vol. 2 No. 5 p. 148.
- ii. CILENTO (R. W.) Dengue Fever [Correspondence].—*Ibid.* Aug 18. No 7 p. 223.
- iii. NOWLAND (Reg. E.) Dengue Fever [Correspondence].—*Ibid.* Aug 25 No 8 p. 234.

i. This case occurred in Sydney in the winter no cases had been reported elsewhere in the district and mosquitoes were absent

The patient lived 700 yards from the docks where ships coming from North Australia were berthed. He gave a history of having been bitten by a large strange mosquito a few days before the fever began. Symptoms: Fever, sore throat, severe pains in back and limbs, bright blood in vomit and stool. Macular rash on third day. Faint measles rash all over the body. Rash on mucous membrane of mouth and palate. General bleeding from mucous membranes. Great listlessness and prostration. No recurrence of fever. The pains in knees and back persisted for some weeks.

The suggestion is that an infected mosquito had been brought on board ship from the Northern Territories where dengue was at the time prevalent.

ii. Cilento suggests that the case recorded by Nowland might be one of endemic typhus. Cases of this disease have been reported from Queensland, right through Australia to Western Australia and on the Queensland-New South Wales border. Such cases are usually associated with wharfs or grain stores where rodents are found as was this case. He considers that unless the Weil-Felix reaction to exclude endemic typhus was employed it is not possible to call this case dengue.

iii. Nowland replies that endemic typhus was definitely excluded. The Weil-Felix reaction was negative. Influenza, typhoid and cerebro-spinal meningitis were also excluded. He has had considerable experience with dengue and has seen many cases. He is satisfied that the case he described was one of dengue.

D H

- LEKKOU (G.) A propos de la dengue et de la fièvre rouge congolaise.—(Dengue and Red Fever of the Congo).—*Bull. Soc. Path. Exot.* 1928 July 11 Vol. 21 No. 7 pp. 583-585 [3 refs.]

This is a reply to the criticism of LEGENDRE (this Bulletin Vol. 25 p. 529).

The author points out that dengue without its pains is not recognisable as such, and adds that he did not propose the name "Fièvre Rouge" as anything new but simply to describe this condition which may be mild dengue or a similar malady or dengue modified by the African environment.

D H

- CARROTTUOVO (G.) Epidemia d'Atrane Dengue (fièvre rouge reumatoidale tropicale benigna).—*Riforma Med.* 1928 Sept 17 Vol. 44 No. 38, pp. 1*18-1*19.

- SOUZA (Pinto) Etiologia, symptomatologia e prophylaxia da dengue.—A epidemia do vao francês Antares no porto da Bahia.—*Sciencia Med.* 1928 June Vol. 6 No. 6 pp. 258-265.

UNCLASSED FEVERS

DE (J. C.) *Difficulties in the Diagnosis of Fevers in the Tropics.*—*Indian Med Gaz* 1928 Apr Vol 63 No 4 pp 177-186
With 12 charts in text

This interesting paper is a further plea for laboratory co-operation in the diagnosis of fevers in the tropics. Unfortunately in the copy of the Gazette available the paper has been badly treated by the binder. Each case is illustrated by a temperature chart with notes of the findings.

The first two cases are instances of blood infection due to *Bact faecalis alcaligenes* which closely resembled typhoid fever in the clinical features. The bacillus was isolated from the blood in both cases and from the stools in one case. There is no mention of the result of agglutination tests with *Bact typhosum* or *paratyphosum* or with the organism isolated from the blood.

The third case was an interesting one of septicaemia due to *Ps pyocyanea* following on a wound the result of a street accident—the bacillus was recovered from the cerebro-spinal fluid. The fever in this case was continuous and lasted 22 days and was followed by complete recovery. The Widal test was negative. The next case of continued fever was one of kala azar diagnosed by culture of the flagellates from the peripheral blood.

Another case of acute fever was proved by the discovery after several attempts of tubercle bacilli in the sputum to be due to tuberculous infection of the lung. The author notes. The manifestation of pulmonary tuberculosis as an acute febrile illness of the typhoid type is by no means uncommon.

The author then refers to mild abortive cases of typhoid fever and gives two charts showing examples of such cases diagnosed by isolation of *Bact typhosum* from the blood. Two other interesting cases illustrated by charts were due in the one to pneumococcal septicaemia and in the other to streptococcal, both made good recoveries. Another case was proved to be due to *Bact coli* infection this bacillus being isolated in pure culture from the blood. Another case in which the fever ran an irregular course was eventually diagnosed liver abscess and was cured by emetine injection without operation although a definite tender local swelling of the liver was detected. The last case of all was proved by blood examination to be due to filarial infection.

D Harvey

HEATLY SPENCER (J) *Some Clinical Observations on the Febrile Diseases of the Baluchistan Plateau.*—*Jl Roy Army Med Corps* 1928 June Vol. 50 No 6 pp 427-437 With 6 charts in text [2 refs.]

The author who is the Medical Specialist Western Command India, gives an interesting account of the various fevers to be met with in that Command, and specially in the garrison of Quetta, Baluchistan.

Sand-fly fever is met with and naturally at the time of the maximum prevalence of the insect vector but it has been noted that there are also atypical fevers resembling sand-fly fever which may occur at times

when it is difficult or impossible to discover *P. papatasi*. Some of these atypical fevers are undoubtedly malarial in origin. On the other hand, there is a group of more importance which is intermediate between sand-fly fever and seven-day fever.

The onset in this type of fever is sudden with severe frontal headache and lumbar pain and the fever lasts from four to eight days. The symptoms in the main resemble phlebotomus fever but there are some important differences. There is no rash, no gastro-intestinal catarrh, no enlargement of the spleen or lymphatic glands. A mild pharyngitis and tracheitis is common but rhinitis has never been observed. The pulse-rate is normal or slightly slowed. There are no joint or long bone pains. A series of 30 cases of this fever occurred in Quetta in the spring of 1925 when no mosquitoes had appeared and only isolated specimens of sand-flies could be found. The main clinical signs and symptoms were —

- 1 Headache and lumbar pain
- 2 Tracheitis
- 3 Occurrence of microscopic blood in scanty viscid sputum.
- 4 Conjunctival injection
- 5 Haemoptysis (macroscopic)
- 6 Pleurisy
- 7 Pleural effusion

Of these cases 28.5 per cent. showed the saddle-type of temperature chart. Blood cultures proved entirely negative both on ordinary and special media. No malarial parasites or spirilla could be found in blood smears and there was no bacteriological evidence of an enteric infection. The author suggests that an enquiry might be made into the etiology of this disease or diseases. So far as the local staff and equipment is available adequate attempts have already been made but, as he rightly observes, it is obvious that the hospital and laboratory staff who are fully occupied in the routine work, could not undertake any elaborate series of investigations. It is for the higher authorities to decide if the provision of special staff and equipment to carry out such an investigation would be justified. Suggestions are made for the line of research along which such a special enquiry might proceed.

As regards the dysentery group recent work in this station (Quetta) has confirmed MANIFOLD's results at Poona, and it is now agreed that over 70 per cent. of the dysenteries in Baluchistan are of bacillary origin. The vast majority of these cases are mild and are due to members of the Flexner group.

The author once again directs attention to the risks attendant on the indiscriminate use of emetine not only in cases of dysentery which may or may not be amoebic in origin, but also in cases of undoubted amoebic hepatitis. For such cases he says that he has discarded emetine alone and relies on a combination of this drug with one of the arsenical preparations such as stovarsol, which are more rapid in their therapeutic effect.

An interesting point illustrated graphically by means of charts, is that in cases of amoebic hepatitis treated by emetine alone the total leucocyte count remained high for a longer period than under stovarsol treatment.

It is now the practice of the writer to give a strictly modified course of emetine by injection—up to six grains—in combination with stovarsol in a dose of twelve grains per day for twelve days. A further course is given after a week or longer interval.

Two interesting cases of mixed infection are recorded one being an amoebic hepatitis with paratyphoid B infection the other hepatitis + malaria + paratyphoid A

D H

BOINET PIERI (Jean) & DUNAN Recherches nouvelles sur la fièvre exanthématique du littoral méditerranéen [*New Work on Exanthematic Fever of the Mediterranean Coast.*]—*Bull Acad Med* 1928 Oct 9 Year 92 3rd Ser Vol. 100 No 33 pp 949-960 With 4 text figs

The authors have seen many new cases of this disease and in their opinion it is neither true typhus nor attenuated typhus. It is a summer disease the maximum incidence being in July and August and is definitely non-contagious cases can be treated in hospital wards without danger of spread. Old practitioners say it has been met with for thirty years in Marseilles and district Records in 1910 1917 and 1921 by various authors can be traced. Italian authors also record a similar disease CARDUCCI in 1920 records cases from 1910 to 1920

In this new series of cases the chief points noted were —

(1) Tache noire first described in 1925 All the new cases showed this a superficial necrotic lesion which is in all probability the site of inoculation.

(2) Eruption, papular or nodular The Weil Felix reaction was negative in all these cases several strains of *Proteus* were used Inoculation of blood into guineapigs was negative Lice were fed on patients and on volunteers without results Ticks are numerous at this season and it is suggested that these insects may be the vectors

D H

BURNET (Et) & OLMER (D) Transmission de la fièvre exanthématique de Marseille aux singes inférieurs. [*Transmission of Exanthematic Fever to the Lower Monkeys.*]—*C R Acad Sci* 1928. Sept 3. Vol. 187 No 10 pp 470-472. With 4 text figs.

In discussing this fever the authors point out that so far it has been found that the Weil Felix reaction is negative and that no febrile reaction is produced in guineapigs by inoculation of the blood They therefore tried intraperitoneal injection of blood from cases of fever into monkeys and the results are recorded in this short paper The monkeys used were *Macacus cynomolgus* and three out of five gave a definitely positive febrile reaction there were no symptoms apart from the fever Also the blood of one of these febrile monkeys when inoculated into another monkey produced fever

D H

MEGAW (J W D) & RAO (S Sundar) Tick-Typhus and other Sporadic Fevers of the Typhus Group.—*Indian Med Gaz* 1928 June Vol. 63 No 6 pp 306-318 With 6 figs. on 2 plates 18 charts & 2 maps in text [14 refs.]

This communication is divided into two sections, in the first of which the various papers and reports concerning the occurrence of typhus-like fevers are discussed. All these papers have been noticed in this Bulletin

The main typhus group of fevers is conveniently divided by the authors into three and here a classification is used which apparently has already given rise to some criticism, that is a classification of a disease in accordance with the insect vector thus —

- | | |
|----------------------|--|
| 1 Louse-borne typhus | Epidemic typhus |
| 2 Tick borne typhus | (Rocky Mountain Fever) |
| 3 Mite-borne typhus | Trutsugamushi disease (Japanese river fever) |

The second part of the paper consists of some further observations on the typhus-like fever of India which are not louse-borne and, as the senior author first suggested, may be carried by a tick.

Reports of cases of this type of fever have been submitted to Colonel Megaw from various centres in India and these are for the first time published in this communication. Clinically these cases gave the picture which is already familiar and in several instances a clear history of tick bite just prior to the outbreak of the fever was obtained and the actual tick identified in all these cases with one exception, infection by the louse was definitely excluded.

The Weil-Felix reaction was tested in practically all these cases, and in only two was a positive reaction obtained and this only in a dilution of 1-80. This is not in accordance with the findings of FLETCHER in Malaya in his cases of tropical typhus in which also the possibility of infection by a tick was considered and which Megaw would include among tick-borne typhus, nor does it agree with tick typhus of North America.

It is true however that the Weil-Felix reaction is not a specific reaction but must be classed as a para-agglutination phenomenon, since the antigen employed has not an etiological significance. It may only be necessary to isolate a local strain of *Proteus* to obtain a positive reaction.

A very complete table is given which shows all the facts so far ascertained regarding these various forms of clinical typhus fever.

From this table it may be noted that tick typhus (Rocky Mountain fever) differs from so-called tick-typhus of India, in that Rickettsia bodies have never been noted in the ticks which are presumed to convey infection in the latter disease whereas they are a marked feature in the tick which conveys the American type of the disease. Also the Rocky Mountain fever is readily transmitted to guinea-pigs and in these gives rise to a reaction comparable to that produced by the injection of blood of epidemic louse-borne typhus fever.

[It would seem, therefore, that the claim that this typhus fever of India is tick borne has not yet been established. It is so far only a presumption. Proof could only be obtained by experiments on volunteers, as was done in the case of yellow fever in America, and confirmatory proof would be the demonstration of Rickettsia in the ticks used in the experiments or in ticks which were supposed to have carried infection in sporadic cases.]

D. H.

MOOSER (H.) Ein Beitrag zur Ätiologie des mexikanischen Fleckfiebers. [A Contribution to the Etiology of Mexican Typhus.]—*Arch. f. Schiff- u. Trop. Hyg.* 1928, May, Vol. 32, No. 5, pp. 261-264. American Hosp. Mexico.]

In spite of much work done, especially during the war, the problem of the etiology of typhus remains obscure. While ROCHA LIMA and

others are of opinion that *Rickettsia prowazekii* is the exciting cause. Some investigators are unwilling to accept this hypothesis and others deny its truth. The difficulty is that the agent of Mexican typhus has not yet been satisfactorily cultivated on artificial media and definite histological evidence of *Rickettsia* bodies in the tissues of man or animals sick of the disease is difficult to obtain and also a definite proof of the identity of the body as found in the infected louse with that in the endothelial cells of man or experimental animals has not yet been established. Smears of lice and stained sections of tissues cannot be contrasted or compared satisfactorily from a bacteriological point of view. The body is so small that it is most difficult to differentiate from cell contents.

In 1917 M. H. NEILL described a clinical symptom in guineapigs [see this *Bulletin* Vol 11 p 141]. He observed that in 70 per cent. of his guineapigs infected with Mexican virus, there was a redness and swelling of the scrotum which reminded him of similar results in Rocky Mountain spotted fever. Curiously NEILL'S observation was never confirmed although in the author's experience it is a practical and never failing symptom in guineapigs infected with Mexican fever virus.

The author's studies of this condition show that typical lesions were to be found not only in the vessels of the scrotum, as NEILL had already shown but most of all in the endothelial lining of the whole of the tunica vaginalis there was a strong reaction consisting of swelling and proliferation of the endothelial cells so that the whole processus vaginalis may be blocked up and the testes become fixed.

Attempts to demonstrate *Rickettsia* bodies in these tissues by means of Zenker's fixation method and Giemsa staining failed. Sections which had been fixed in Regaud's mixture were then stained by Giemsa and the author was astonished to find in a few sections so treated numerous swollen endothelial cells which were packed with tiny reddish to reddish blue diplobacilli so much so that such cells could be easily picked out with the low power of the microscope. As these cells were found in sections of tissue it was difficult to determine the individual characters of these objects but by making smears from the tunica vaginalis it was possible to see endothelial cells spread out and it was easy to demonstrate the intracellular micro-organism.

In smears from all the twenty two animals which were killed during the period of scrotal swelling were found intracellular gram-negative diplobacilli of the most slender proportions which could only be clearly stained with Giemsa and which more or less filled the affected cells. The numbers of these were enormous but the shape was difficult to recognize except at the periphery of the cells or in the neighbourhood of cells which had ruptured. In some cells they were only in single pairs or in small colonies. They were mostly the very faintest reddish pink or bluish pink stained diplobacilli with an unstained space separating the individuals which were usually arranged in a straight line or might make an obtuse angle with each other. Both ends of the individual bacilli were rounded off. Often pairs of diplobacilli were united by a bluish-stained cross-piece.

The author has not examined infected lice but these forms have a remarkable resemblance to the bodies ROCHA LIMA found in the louse. Therefore the author considers that his findings give indisputable support to the *Rickettsia* theory of the origin of Mexican typhus.

He further injected guineapigs with a few drops of serous fluid from the swollen tunica and in three or four days they became infected.

The writer himself was accidentally infected by scratching the back of his hand with a papette and in 11 days he got fever which lasted 12 days

D H.

PENFOLD (W. J.) & CORKILL (A. B.) A Case of Typhus-like Fever.—*Med J Australia* 1928 Sept 8. 15th Year Vol. 2. No 10. pp. 304-306 With 3 charts in text [5 refs.] [Baker Med. Research Inst. Sydney]

This was the case of a male aged 38, who was admitted to hospital with a typhus-like fever which lasted about ten days after admission. The Vidal reaction was negative, and the Weil-Felix strongly positive. Injections of a *B. coli* vaccine were given intravenously on three occasions. There was a marked febrile reaction after each dose, and the temperature fell by crisis. In previous cases of mild typhus-like fevers in Australia, although the Weil-Felix reaction has been positive injection of the patient's blood intraperitoneally into guineapigs has not given rise to any febrile reaction. Unfortunately in this case it was not possible to inoculate guineapigs with the blood during the fever

D H.

CHIABRERA (G.) & REITANI (U.) Contributo allo studio delle setticemie da *Micrococcus tetragenus*. [Septicæmia due to *Micrococcus tetragenus*.]—*Polichinico Sez. Prat.* 1928. Sept. 17 Vol. 35 No 37 pp 1775-1780 With 1 chart in text [29 refs.] [Principal Military Hosp. Alessandria.]

A description of a case of septicaemia due to *Staphylococcus tetragenus* is given. The difficulties of diagnosis in such a case are great and the possibilities of confusion with typhoid affections, undulant fever, influenza or malaria are referred to. In this case the diagnosis was settled by blood culture with positive results on three occasions. It is suggested that the portal of entry was the tonsil. Convalescence in these cases is apt to be slow and the weakness left by the illness may be great. The best mode of treatment is by means of an autogenous vaccine.

W F Harvey

JAPANESE RIVER FEVER.

FLETCHER (William) LESSLAR (J. E.) & LEWTHWAITE (Raymond) The Aetiology of the Tsutsugamushi Disease and Tropical Typhus in the Federated Malay States. A Preliminary Note.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928 Aug 22. Vol. 22. No 2. pp 161-174 With 7 figs. [9 refs.] [Inst. for Med. Research, Kuala Lumpur F.M.S.]

This paper gives a clear description of the principal clinical features and etiology of tsutsugamushi disease especially of the primary ulcer and bubo as seen in four cases which occurred in Malaya and were

treated in the European Hospital at Kuala Lumpur. A detailed clinical description of these cases has already been given in the Bulletin of the Medical Research Institute of which the senior author was at the time Director. The disease is prevalent in Japan and Formosa, and also in Sumatra, which is only twelve hours distant across the straits from Malaya. The four Europeans contracted the disease while engaged in clearing or rather re-clearing an area of ground which had become overgrown with scrub and long grass and which was infested with rats. It was shown later that these rats harboured the mite *T. deliensis* which is the carrier of the disease in Sumatra and it is highly probable that this mite is also responsible for the infection in Malaya.

A very careful and accurate description of the various Trombiculæ found on rats and in man in the neighbourhood of Kuala Lumpur is given in the paper and these descriptions should prove of great assistance to anyone who should happen to meet with cases of the disease.

It is proposed to deal with tropical typhus which resembles tsutsugamushi disease in many particulars in a further communication.

D Harvey

OGATA (Norio) NAGAI (Shunji) & UNNO (Sachitane) [A Rare Case of Laboratory Infection by Tsutsugamushi Disease.]—*Chiba Igakkai Zasshi* (Jl Chiba Med Soc) 1928 Jan Vol 6 No 1 [Summarized in *Japan Med World* 1928 Apr 15 Vol 8 No 4 p 100]

The authors record a case of tsutsugamushi disease contracted accidentally in the laboratory. One of their collaborators Dr Kitigawa while inoculating an experimental animal unfortunately ran the needle of the hypodermic syringe charged with infective material into his own arm. The incubation period (16 days) was longer than in the natural infection and the clinical symptoms were by no means typical but animal experiment and post mortem examination proved that he had been infected with tsutsugamushi disease.

D H

VAN DRIEL (B M) Ein merkwürdiger Fall von Milbenfieber (Pseudotypus kedani) [A Remarkable Case of "Mite Fever" (Kedani, Pseudotypus, Japanese River Fever)]—*Arch f Schiffs- u Trop Hyg* 1928 July Vol. 32. No 7 pp 363-368 With 1 chart in text [2 refs.]

A case of this disease with unusual clinical features occurred in Sumatra. The patient was a Javanese contract field worker of 38 years who had been 16 years in the country. He was admitted to hospital with fever and on examination a typical primary ulcer and swollen glands were at once discovered in the axilla. The patient himself volunteered the statement that he had been bitten on this site by a mite which he and his fellow workers know as *koetoe babi*, the native name for a mite or tick. Malaria and typhoid were excluded by careful examination of the blood and by Widal reaction both of which were negative. The disease pursued its usual course for the first week or so when the patient developed a peculiar tremor of the muscles including the tongue hands and feet. These tremors became general and so severe that they entirely prevented sleep. The patient became practically moribund but gradually recovered as the tremors passed off and finally made a complete recovery. Another

remarkable feature was the presence of lesions of the eye including inflammation of the optic disc and the presence of opacities in the cornea and vitreous. This also cleared up. The author emphasizes the necessity of an ophthalmoscopic examination in this and other tropical diseases.

D H

DUNLOP (George A.) An Approach to Treatment and Illustrative Cases including a Case of Japanese River Fever treated with Stabilaran (Boots) and Lumbar Puncture.—*Malayan Med J* 1928. Sept. Vol. 3 No. 3 pp. 107-112. [11 refs.]

The treatment of various conditions is discussed among them a severe case of River fever treated by deep subcutaneous injections of stabilaran. A planter was admitted to hospital with fever and rash and a very severe headache so severe that lumbar puncture was resorted to and 10 cc. of fluid under pressure was drawn off. The back of the left calf was the site of the primary ulcer and the glands draining this area were enlarged and painful. After one injection of stabilaran, gm. 0.15 the headache cleared up and the temperature commenced to fall and returned to normal in 6 days after a second injection of gm. 0.3. The primary ulcer cleared up remarkably quickly much more quickly than in other cases not treated in the same fashion.

D H

OROYA FEVER AND VERRUGA PERUANA.

NOGUCHI (Hideyo) Etiology of Oroya Fever XII. Influence of Malarial Infection (*Plasmodium vivax*?) Splenectomy or both, upon Experimental Carrion's Disease in Monkeys.—*Jl Exptl. Med* 1928. May 1 Vol. 47 No. 5 pp. 821-827. 8 refs.] [Rockefeller Inst. for Med. Research New York.]

Experiments were carried out by the author to ascertain whether malarial infection or splenectomy in monkeys in any way affected the experimental infection of these animals with the organism of Oroya fever. Blood was withdrawn from a monkey suffering from spontaneous malarial infection (*Plasmodium vivax*) and injected into monkeys (a) one month before inoculation with virulent verruga material (b) simultaneously with the verruga material and (c) during convalescence from verruga infection of moderate severity. All the monkeys developed malarial infection and suffered one to three paroxysms during a period of about one month. The verruga lesions appeared in the inoculated animals in due course and showed no marked difference from the same lesions in control animals. The parasite *Bartonella bacilliformis* was recovered from the blood, which also contained plasmodia. The lesions in the convalescent animals continued to heal as usual.

The malarial infection therefore had no effect upon the course of verruga or upon the establishment of immunity. Similarly splenectomy led to no appreciable aggravation of *Bartonella* infection. Even the combination of splenectomy with malarial infection did not appreciably aggravate the experimental verruga in monkeys.

D Harvey

MONJE (Carlos) & WEISS (Pedro) Sobre hematología de la verruga peruana [The Haematology of Verruga peruana.]—*in Fac de Med Lima* 1927 June-July Vol 10 No 2. pp 97-101

Thus is a description in general terms of the blood-changes met with in Verruga peruana. The intense anaemia is accompanied by the presence of corpuscles of the regenerative types hence the slide shows many immature corpuscular forms. Thus we find erythroblasts with basophilia, together with polychromatic and orthochromatic forms. Degenerate corpuscles are also found, but these are much less in evidence.

As regards the leucocytes, there is a shift of the Arneth index to the left and promyelocytes, myelocytes and metamyelocytes are plentiful also lymphoblasts and young monocyte forms together with Turch cells and the Rieder type of lymphocyte evidence of profound shock to the haemopoietic system with marked efforts at regeneration.

H. Harold Scott

DA CUNHA (Aristides Marques) & MUNIZ (Julio) Considerações a respeito da verruga peruana. [Verruga peruana.]—*Sciencia Med* 1928 June Vol 6 No 6 pp 293-294

Having noted that NOGUCHI had recorded as Bartonella bodies groups of bacillary elements met with in verruga nodules resulting from inoculation of a monkey with a culture and later that the organisms were contained in the endothelial cells the authors have again examined their smears and failed to see any of these groups but only the single forms as described earlier by them. They suggest that what NOGUCHI saw were secondary infecting organisms and not Bartonella at all.

H. Harold Scott

UNDULANT FEVERS

PUBLIC HEALTH REPORT* 1928 Apr 6. Vol. 43 No 14 p. 819
—Undulant Fever in New York State.

It is estimated that 30 per cent of the herds of cattle in New York State are affected with contagious abortion. From January 1st 1928, to March 1928 24 cases of undulant fever have been notified to the authorities in New York State of these one was due to a laboratory infection with *Br melitensis* whereas the others were probably all caused by *Br abortus* since agglutination of that bacillus occurred with a higher dilution than with *Br melitensis*. In one small outbreak the source of infection was traced to one herd of cows in which cases of contagious abortion had recently occurred. The sera of the cows agglutinated *Br abortus* in high dilution.

D Harvey

LENDTROP (Harry) Maltafieber an der Ostküste des Schwarzen Meeres des Kaukasus. Undulant Fever on the East Coast of the Black Sea.]—*Russisch Jl Trop Med.* 1928. Vol. 6. No 3 German summary p 207 [In Russian pp 157-167 35 refs.]

In the years 1924-1925 in the district of the Caucasus on the east coast of the Black Sea six cases of undulant fever were diagnosed by means of agglutination tests, or by isolation of the causal organism from the blood. These were the first cases to be described in this area. In the course of the year 1927 thirteen more cases were discovered. The organism isolated was, culturally and morphologically identical with the *Br melitensis* of Bruce. On the epidemiological side it was suspected that the cases were due to infected goats and on examination of a herd of 100 the sera of 16 gave a marked agglutination for *Br melitensis*. In the opinion of the writer this disease is not a new importation to the district but has previously been confused with malaria, typhoid, endocarditis tuberculosis, etc.

D H

MISURACA (S) [La febbre ondulante e le sue complicanze] [Undulant Fever and its Complications.]—*Rivista Sperimentale Siciliana* 1928 Apr 1 Summarized in *Ann. di Med. Nov e Colon* 1928 July-Aug Year 34 Vol. 2 No 1-2. pp 113-115]

Undulant fever which, up to a few years ago was quite rare in Sicily has now assumed epidemic proportions and some hundreds of cases occur every year. The author has observed many cases and states that the majority are due to infection from goats by consumption of unboiled milk. He gives a full and detailed account of the symptoms and also of the complications which he has met with these include nephritis tonsillitis, pharyngitis and oedema of the joints which are rare, and neuralgic neuritis which is common and tends to recur. Cutaneous manifestations were also noted such as milium eruptions, urticaria and purpura and chest symptoms such as pneumonia, bronchitis and pleurisy. The mortality is low 1 to 2 per cent. and death is usually due to intercurrent infection. As regards treatment he speaks very highly of specific vaccine therapy which yielded excellent results in his hands.

D H

GIUGNI (Francesco) & SAVORINI (Giovanni) La ricomparsa di nuclei epidemici di febbre melitense. Rilevi clinici ed epidemiologici. *Associazione di malaria e febbre melitense* [Reappearance of an Epidemic of Undulant Fever. Clinical and Epidemiological Points. Association of Malaria with Undulant Fever]—*Giorn di Clin Med* 1928 May 20 & June 10 Vol. 9 Nos. 7 & 8 pp 345-350 359-377 With 2 charts [Umberto I Hosp Lugo]

No cases of undulant fever had been met with in Lugo for some two years when a fresh outbreak arose which was traced to a wandering flock of sheep introducing infection to cattle by excretal contamination of the fodder or bedding. Human individuals in turn became infected by drinking the milk or eating cheese made from the milk of the cows which had aborted. Seven cases are mentioned in detail the diagnosis was made by agglutination of serum with *Brucella melitensis* alone or with *Br abortus* also in equal titres. In one case No 7 in the list malarial parasites were found in the blood in the early days of the fever but the temperature returned after 4 days apyrexia the effect of administration of quinine in large doses (2.5 gm daily) and haemoculture yielded a growth of *Br melitensis*. The serum from this patient also gave positive agglutination with this organism and with *Br abortus*. The chart of this case is reproduced in the paper and shows well the temperature of the malarial infection in the early days to give place to that more closely resembling undulant fever and later the intermittent malarial type of fever in the relapses.

The period of incubation varied between ten and twenty days. Most of the cases ran an average course. One however passed blood in the urine for nearly three weeks. This complication has been noted by others but is not very common.

H. Harold Scott

KAMPMELER (R. H.) Undulant Fever (*Brucella melitensis*) With Three Cases Each, Due to Bovine and Goat Origin.—*Amer J Med Sci* 1928 Aug Vol. 176 No 2. pp 177-181 [8 refs.] [Med. School Univ Michigan]

Six cases of *Brucella* infection are recorded three occurred in Michigan, where infection was due to consumption of unboiled cows milk, and three in the state of Utah which were due to the consumption of goats milk. In the Michigan cases there was no contact with goats and the Utah cases no contact with cows.

Utah Cases Goats Milk		Michigan Cases Cows Milk	
Culture	Agglutination	Culture	Agglutination
++	1/100	—	1/1 280
++	1/320	—	1/320
+	not done	—	1/320

Clinically the Utah or *Br melitensis* cases were much more severe than the Michigan or bovine cases. [The agglutinations were all carried out with *Br melitensis* no mention of agglutination with *Br abortus*] It is also interesting to note that all the blood cultures in the bovine cases were negative whereas in the *melitensis* cases all were positive and the coccus was also recovered from the urine.

D. H.

MADSEN (Th) Undulant Fever (*B. abortus*)—*League of Nations Monthly Epidemiol Rep* 1928. May 15 Vol. 7 No 5 pp. 194-196 Map on p 186 [1 ref.]

The author of this note refers to reports from various countries—United States, Germany, England, France and Italy—of the occurrence of cases of undulant fever due to *Br. abortus* or at any rate cases due to infection from cattle suffering from contagious abortion and in which infection from goats could be definitely excluded. A systematic investigation of this problem was carried out at the State Serum Institute of Denmark by Dr. MARTIN KRISTENSEN (see below) and the following is a *resumé* of his work—

Since April 1927 all sera sent to the Institute for Widal reaction have also been tested against *Br. abortus*. In one year 2,500 sera were received from 2,100 patients and of these 222 gave a definite positive reaction (above 1:100) with *Br. abortus*. *Br. abortus* was also recovered in pure culture from the blood of 18 cases out of 27 attempts. Fifty sera from a district in Greenland, where there are no cattle, all gave a negative result. In 43 cases the infection could be traced to contact with sick cattle, in 60 to contact—consumption of raw milk, and in 68 cases there was no history of any contact with sick cattle but raw milk from such cows had been consumed. In no case was there any history of contact with goats or consumption of goats' milk. In no instance was there more than one case in the same family and cases of the disease were spread over the whole country.

The sex and age distribution is of interest—

Years.	0-8	9-14	15-19	20-4	25-9	30-4	35-9	40-4	45-9
M	Nil	8	20	24	23	28	23	8	6
F	Nil	8	7	4	5	4	4	7	6

Years.	50-4	55-9	60-4	65-9	Un- known	Total
M	1	7	3	0	15	166
F	2	2	2	2	3	58

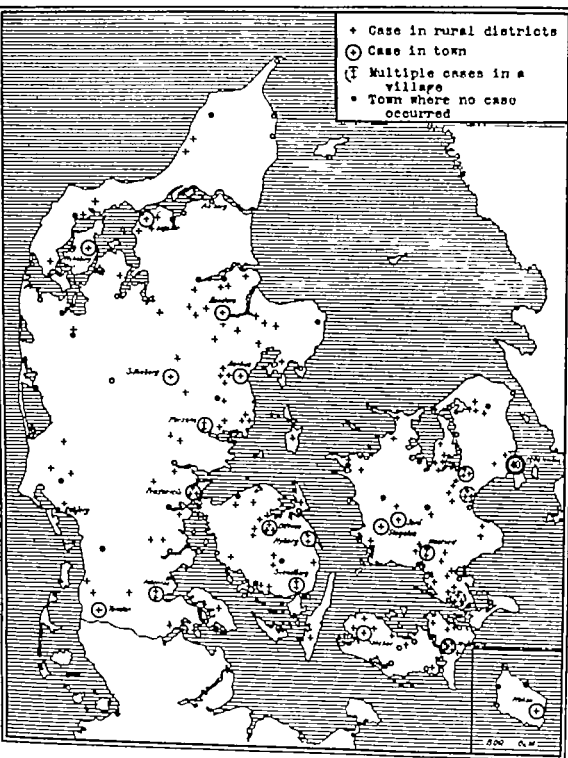
An illustrative case with a typical temperature chart is given showing an undulant type of fever lasting in all over four months, with pains in the joints and enlarged spleen.

D. H.

CARPENTER (C. M.) & BOAK (Ruth) *Brucella abortus* in Milk and Dairy Products.—*Am. J. Public Health* 1928 June. Vol. 18. No 6 pp 743-751 [20 refs.] New York State Veter College Cornell Univ. Ithaca, N. Y.

The authors point out that medical literature records a slow but steady increase in the number of cases of undulant fever in the United States.

They found only small numbers of *Br. abortus* in the milk of naturally infected cows. Plate counts of milk from carriers in several herds were made and showed an average of 20 to 440 colonies per cc. Their experience that the majority of the organisms are to be found in the cream, coincides with that of HUDDLESON (this Bulletin Vol. 24 p 819).



Distribution of Undulant Fever cases due to *B. abortus* in Denmark from April 1st 1927 to March 31st 1928

[Reproduced from *League of Nations Monthly Epidemiological Report*]

A study of the milk of 378 cows from three dairies as proved by inoculation of samples of milk into guineapigs showed that 6.08 per cent were infected. Approximately 20 per cent of these cows showed specific *abortus* agglutinin in their blood serum.

The longevity of *Br. abortus* in cream was tested. A quart of cream was divided into five samples of about 250 cc. and placed in sterile flasks. 5 cc. of a water-clear suspension of *Br. abortus* was added to each. The cream was stored in the refrigerator at 8° C. Guinea pigs were injected four times at 2-day intervals with 2 cc. of each of the contaminated samples. After 8 days guineapigs were injected with the cream at 5-day interval. The pH value of the cream when purchased was 6. The longevity of *Br. abortus* in butter was tested in like manner. The guineapigs were killed at approximately 5 weeks after injection and examined. Two of the strains infected guineapigs over a period of 10 days; the two other strains not after 8 days. The opinion is expressed that the germs were killed by the lactic acid produced in the cream. Samples of butter inoculated with certain strains infected guineapigs up to 142 days after inoculation.

Eighty-two samples of imported cheese were also tested, but infection by *Br. abortus* or *Br. melitensis* was never found in the guineapigs used in the experiments.

The authors are of opinion that exposure to pasteurization at a temperature of 140° F. to 145° F. for thirty minutes would destroy *Br. abortus*.

D. H.

KERN (Richard A.) *The Clinical Aspects of Brucella melitensis var. abortus Infection in Man. A Report of the First Cases recognized in Pennsylvania.*—*Amer. J. Med. Sci.* 1928. Sept. Vol. 176 No. 3 pp. 405-430 [57 refs.] (Med. Division of Hosp., Univ. Pennsylvania).

This long and elaborated paper consists principally of a review of the present-day knowledge of *abortus* infections in man. The author is convinced that many cases of this disease are overlooked by the general practitioner in America, and with a view to the dissemination of knowledge and arousing interest, he gives a complete account of the clinical, bacteriological and epidemiological aspects of the subject with full references to recent work. At the end of the paper a detailed clinical description is given of two cases which occurred in Pennsylvania and were diagnosed by the author on clinical symptoms and by the agglutination test. One of these was the first case of the disease notified in this State.

[For anyone who wishes to obtain in a single paper a review of present-day knowledge of *abortus* infection this paper well repays perusal.]

D. H.

SENSEXICH (R. L.) & JORDANO (Alfred S.) *Brucella abortus Infection in Man. Report of Seven Cases.*—*J. Amer. Med. Assoc.* 1928. June 2 Vol. 80 No. 22 pp. 1792-1798. [11 refs.]

This paper consists of a very careful and detailed clinical description of seven cases of undulant fever due to *Br. abortus* derived from cows.

milk. So far as the bacteriological diagnosis went the sera agglutinated *Br abortus* as shown below and in one case a few colonies of this organism were obtained by culture from the blood. All the patients had just prior to the illness been consuming large quantities of raw cows' milk and cream from herds which were known to be infected

Blood culture		Agglutination		
		<i>Br abortus</i>	<i>Br melitensis</i>	<i>Bact typhosum</i>
+	Case 1	1/3000	1/50	Nil
—	Case 2	1/3000	1/50	Nil
—	Case 3	1/1600	1/80	Nil
—	Case 4	1/320	1/20	Nil
—	Case 5	1/1200	—	Nil
—	Case 6	1/20	—	—
—	Case 7	1/320	—	—

The authors point out that successful culture of *Br abortus* from the blood is exceedingly difficult much more so than in *Br melitensis* infections. This point has been noted by BURDET in experimental infection in goats [see this *Bulletin*]. Taken generally the case could be classified in three groups similar to the types found in *Br melitensis* infection—(1) Undulant (2) Intermittent (3) Ambulatory.

A summary of the characteristic symptoms is given. Anorexia, loss of weight and strength, headache and chills, fever and sweats of varying intensity through long periods of time, frequently with intermissions. The fever has a tendency to exhibit undulations which may vary in character and length. Evidence of the effect of the disease on the nervous system is constant and arthritis is a common symptom.

Although a positive blood culture and positive agglutination test aid in arriving at a definite diagnosis, yet the authors are of opinion that true infections may occur in which neither can be obtained (Case 6).

It will be gathered from a perusal of the chief symptoms that there was nothing in the clinical course of the disease to distinguish these cases from cases of infection by *Br melitensis*. That is to say, it is not possible on clinical grounds alone to say this is a case of *abortus* infection and this of *melitensis*.

D. H.

HABE (Horst) *Bact abortus* Bang als Erreger septischer Erkrankungen beim Menschen. [*Brucella abortus* as the Cause producing Septic Diseases in Man.]—*Ztschr f Klin Med* 1928 June 30 Vol. 108 No 4 pp 445-462 With 7 text figs. [12 refs.] [Med Clinic, Kiel]

The author refers to recent cases of infection in man attributed to *Br abortus* and especially to 5 cases in veterinary surgeons in Germany who had been treating cows affected with contagious abortion. These cases were believed to be due to direct infection from the placentas through cuts or abrasions on the fingers. In the 4 cases to be described

in this paper he considers that infection took place through the milk. In Germany over 40 per cent of infected cattle have the germ in the milk for considerable periods after they have suffered from abortion.

All four cases were in men who were employed in agricultural work, and at least two of them had nothing to do with cattle directly but all were in the habit of drinking large quantities of cows' milk which had not been boiled. None had any contact with goats.

The only remarkable thing regarding the clinical course lay in its mildness apart from the fever the symptoms were practically nil except for severe pains in the back. The temperature charts show a fever lasting about two months, but this had more of the remittent than the undulant character. Other diseases such as typhoid and tubercle were carefully excluded by the examination of the blood.

The cases were finally diagnosed on the results of agglutination tests the sera of all four agglutinated *Br abortus* strongly up to a dilution of 1:1000 and *melitensis* only in lower dilutions and not completely also in one case a blood culture was positive. In addition, they were diagnosed as *abortus* infections on epidemiological grounds for the reason that Malta fever is unknown in Germany except for a few imported cases and rare laboratory infections which have not infected other persons also the goats in the district (Kiel) where these cases occurred have been carefully examined and found to be free from *melitensis* infection.

Italian writers are of opinion that infections of man from cattle are due to an original infection of the cattle with *melitensis* but the author considers that this is unlikely in Kiel district as the goats are not infected.

(There is no account of a bacteriological investigation of the strain isolated from the blood.)

D. H.

VAN DER HOEDEN (J.) Over febris undulans bij den mensch, veroorzaakt door bacterium abortus infectiosa bovum Bang. [Undulant Fever in Man caused by *Br abortus*.]—*Nederl Tijdschr v Geneesk* 1928, Oct. 6, 72nd Year 2nd Half, No 40 pp 4907-4943. With 14 figs. [71 refs.]

The histories are quoted of 13 cases from various parts of Holland in which by serological examination, the (not diagnosed clinically) diagnosis of febris undulans was made (in one case also confirmed by cultivation of *Br abortus* Bang from the blood). The clinical picture and the temperature curve were as usual. One patient died from complications. The agglutination titre of the patients' serum against *Br abortus* was at least 1:1600 whilst in 764 control cases it was never higher than 1:160. In 4 cases the infection could be related to the patient's occupation (obstetrical assistance to cattle suffering from infectious abortion) in 7 cases the probable cause was drinking of raw milk in the other 2 cases both possibilities existed.

It is possible that so far febris undulans has been overlooked. On the other hand, the greater prevalence of infectious abortion of cattle as well as a greater virulence of the *Br abortus* may account for the recent spread of the disease in man.

W. J. Bela.

LECEZYŃSKI (Stanislas) Deux cas d'infection humaine par le bacille de l'avortement épizootique de la vache (bacille de Bang) **Two Cases of Infection of Man by the Abortion Bacillus.**—*C R Soc Biol* 1928 Sept 18 Vol 99 No 26 pp 919-920

Two cases of *Br abortus* infection are reported from Poland in which country undulant fever is unknown and infection from goats could be definitely excluded. The patients were veterinary officers who had treated cows suffering from contagious abortion one of them developed a furuncle on the hand a week or so after exposure to infection. The incubation period of the fever was from 4 to 8 weeks. In the one case the fever was intermittent and lasted six weeks in the other a wave of fever lasted 15 days followed by an afebrile period of 20 days and another wave of fever lasting 15 days. The blood serum of both cases agglutinated *Br abortus* in 1:1600 dilution and *Br melitensis* at the same titre the complement fixation test was positive. The Widal and Weil Felix reactions were negative as were also blood cultures and urine cultures.

D H

ROCH (M) MONEDJIKOVA (V) & MARTIN (E) Fièvre ondulante d'origine bovine chez l'homme. Infection par le *Bacillus abortus* de Bang [**Undulant Fever of Bovine Origin in Man.**—*Revue Méd Suisse Romande* 1928 Aug 25 Year 48 No 10 pp 657-671 [16 refs]

Three cases have come under the notice of the authors one is described in detail.

This was the case of a farmer who kept no goats but had several cattle which had suffered from contagious abortion and which he himself had looked after he and his family had also consumed the unboiled milk of the cows.

The fever lasted from February 29th to June 10th the spleen was enlarged and there was a leucopenia blood culture was negative (culture only kept a few days) as was the Widal reaction a microscopical agglutination test against *Br melitensis* was also returned as negative and an intradermal melitine test was also negative and thus the diagnosis was not arrived at till some time after the fever had ceased.

On the suggestion of Prof NÄGFLI the serum was retested against other strains of *Br melitensis* and *Br abortus* and was found to agglutinate *abortus* 1/500 *melitensis* 1/1000 an intradermal test with freshly filtered toxin was also strongly positive.

Thirty three days later the agglutination test was repeated with the following result *abortus* 1/1000 *melitensis* 1/250 Absorption tests were also carried out.

The patient's serum absorbed with *abortus* removed both agglutinins but absorbed with *melitensis* the *abortus* agglutinins were only slightly reduced whereas the *melitensis* agglutinins were removed.

The rest of the paper is a resumé of cases of *abortus* infection reported in other countries and Switzerland may now be added to these.

D H.

SCOZZAFAVE (I) & WARNER (W P) *Brucella abortus* Infection in Man.—*Canadian Med Assoc J* 1928 Aug Vol 19 No 2 pp 177-180 With 2 charts in text [8 refs]

The first two cases of *abortus* infections in man reported in Canada occurred in 1925 in Toronto and three others were reported soon after in Ottawa.

Two further cases are now reported in detail by the authors.

Case 1. The patient had been ill for 8 months before he was seen with fever and rigors, his temperature chart was a typical undulant one and, as the authors note comparable to the Pel-Ebstein type of fever usually associated with that form of Hodgkin's disease.

Br. abortus was recovered from the blood and the blood serum agglutinated *abortus* 1/200 *melitensis* 1/80.

The source of infection was not traced.

Case 2. Gave a history of nearly six months illness with a week of fever alternating with a week free from fever and with comparative good health, when she was able to get about and do house work, followed by another week of fever and so on. Agglutination 1/320 *Br. abortus* 1/168 *melitensis*.

Blood culture negative. Source of infection not traced.

D. H.

CAMBESSÉDÈS (H.) & COCHEZ. Un cas de fièvre ondulante guérie par la vaccinothérapie. Case of Undulant Fever cured by Vaccine Therapy.—*Rev. Méd. et Hyg. Trop.* 1928. July-Aug. Vol. 20. No. 4. pp. 103-108. With 3 charts.

This case of undulant fever commenced in December 1927 but was not definitely diagnosed until May 1928. The diagnosis was arrived at by the agglutination test which was positive in 1/800 dilution, also a strongly positive intra-dermal reaction was given. On May 11th a small intra-venous dose of a solution of *abortus* globuline was given. This was followed by a considerable febrile reaction but next day the temperature fell to normal and the patient made a quick recovery. [The only criticism that one might offer is that the case had already lasted for six months before the dose of vaccine was given, and there are indications from the chart that the fever was nearing a spontaneous end. At the same time this "shock" method of treatment should be considered in long drawn-out cases.]

The author emphasizes the point that, in patients who are sensitized by a long course of fever, only a normal dose should be given. If the dose is too great, severe shock may result.

The state of sensitization may be judged to some extent by the result of the intra-dermal test.

D. H.

IZAR (Guido). Maltafieber und Chemotherapie. [Chemotherapy of Undulant Fever].—*Seuchenbekämpfung* 1928. Vol. 5. No. 3. pp. 147-154. [23 refs.]

The author advocates the use of trypanflavin in the treatment of undulant fever. 51 cases were admitted to hospital at one time. He found that the best effect was obtained if the drug was given in the maximum intravenous dose of 1 cgm. for each kg. of body weight or 0.8 gm. for a man of 60 kg. This dose may require to be repeated once or perhaps twice and care must be taken that the drug goes directly into the vein and not into the cellular tissue.

D. H.

DIMOW (D K) & NAKHAPETOFF (M I) Sur la question des affections pulmonaires spécifique dans la fièvre de Malta [*Specific Lung Infections in Undulant Fever*].—*Russian Jl Trop Med* 1928 Vol. 6 No 5 French summary p 282. [In Russian pp 281–282.] [Infectious Diseases Clinic, Hind Univ & Trop Inst Moscow]

The authors observed a severe case of undulant fever with recurrent attacks of broncho-pneumonia these attacks appeared and disappeared with the waves of temperature They succeeded in isolating *Br melitensis* from the sputum at the 2nd 3rd and 4th recurrence of the attacks of broncho-pneumonia. The micrococcus isolated from the sputum was agglutinated by the blood serum of the patient to a higher degree than was the strain isolated by blood culture from the same patient.

D H

KRISTENSEN (Martin) Untersuchungen ueber die Rolle des Bangschen Abortbazillus als menschenpathogenen Mikroben [*The Pathogenicity of the Abortus Bacillus for Man.*].—*Cent f Bakt I Abt Orig* 1928, July 25 Vol. 108. No 1-4 pp 89–102 With 6 text figs. [13 refs.] [State Serum Inst Copenhagen]

The author refers to the increasing number of cases of abortus fever in man in various countries discovered in recent years and considered to be due to infection by *Br abortus* derived from cows

In view of the prevalence of contagious abortion in Denmark and the large number of people employed in close contact with cattle, he considered that many cases would be discovered if careful bacteriological investigations were carried out Hence the researches described in this paper

A standardized emulsion of a strain of *Br abortus* was obtained from the Veterinary College where it had been employed for the routine diagnosis of contagious abortion in cattle All the sera sent to the Institute for the purpose of carrying out the Widal reaction were also tested against the *abortus* emulsion 1375 sera obtained from 1171 patients were tested from April 1st 1927 to November 15th 1927 and of these 89 gave a positive reaction in at least a dilution of 1/100 with *Br abortus* The dilutions of sera actually employed were 1/100 1/200 1/400 1/800 and 1/1600 and the sera were classified as follows

1/100	5
1/200	20
1/400	27
1/800	18
1/1600	17
	—
	87

Two of the sera were tested on a different scale and are not included.

The complement fixation test was also employed and was also strongly positive in all the sera which had given a positive agglutination Of 277 sera which gave no agglutination only two gave a feebly positive complement fixation.

The patients from whom these sera had been obtained were followed up and it was found possible to make blood cultures from 20 of them

and of these 13 yielded a culture of a micrococcus which gave all the classical reactions of the *Br abortus* and grew well under an atmosphere of CO₂.

These cocci were also agglutinated by the serum of a rabbit which had been immunized by injection of the *abortus* culture used in the agglutination tests.

Four of the strains which had been isolated from the patients were taken along with five *abortus* cultures derived from cattle suffering from contagious abortion. These nine strains were used to produce high titre sera in rabbits, and cross agglutination and cross absorption tests were carried out and proved these strains to be serologically identical as they were also identical in morphology and culture.

In addition, the strains isolated from the patients were inoculated into guinea-pigs and produced the typical signs and symptoms of *abortus* infection and the bacteria were again isolated from these animals and identified. The serum of the guinea-pigs agglutinated the stock *abortus* culture.

Two cows which were pregnant were given intravenous doses of living *abortus* which had been isolated from two of the patients and ten days later they aborted and the organism was isolated from the placental discharge and from the foetus.

A full clinical description of some of the cases is given and also a composite clinical picture of several of them, and it is shown that clinically these were true cases of undulant fever and that there were no symptoms present which would not also be met with in *melioidosis* infection, nor were any such symptoms unrepresented if all the cases were reviewed.

As regards the epidemiology infection from goats or goats milk could be definitely excluded in practically all the cases.

With reference to infection from cattle, the following table was drawn up —

	♂	♀	
(a) Close connexion with cattle the subject of contagious abortion	33	1	34
(b) Accustomed to drink raw milk of such cattle	26	13	39
(c) Uncertain	9	7	16
	68	21	89

[Reports of cases of *abortus* infection in man have recently been received from various countries and in some of these cases the identification of the infecting organism has been based rather on circumstantial evidence than on definite bacteriological proof. But it can be said of the present series of cases that they have been definitely proved to be due to an infection with *Br abortus* derived from cattle, the infecting organism having been isolated and identified by careful bacteriological tests. There is only one further point which might be of interest and that is a comparison by laboratory tests of the strains isolated in Denmark with known strains of *Br melitensis* isolated from cases of fever in Malta of caprine origin.]

BURNET (Lt.) Inoculations comparées d'abortus et de *melitensis* chez la chèvre [Inoculation of Abortus and Melitensis in Goats A Comparison.]—Arch Inst Pasteur de Tunis 1928 June Vol 17 No 2 pp 108-127 [5 refs]

This paper gives an account of the inoculation of goats with *Br melitensis* and with *Br abortus*

It is well known that *melitensis* produces abortion in goats but is the disease in goats exactly comparable to the condition in cows infected with abortus? It is possible that abortus which in the opinion of the author is non pathogenic for man when derived from cattle becomes pathogenic for man by passage through the goat and reciprocally does *melitensis* lose its pathogenic power for man by passage through cows? In the following experiments an attempt was made to answer some of these questions

Two series of experiments were carried out Series I on young goats which were not pregnant the second series on older goats which were pregnant for the first time All goats used in the experiments gave a negative blood culture and negative serum reaction before being employed The test whether infection had taken place or not was the recovery or not of the organism from the organs post mortem Recently isolated strains of *abortus* and *melitensis* were used

Two goats first of all received varying doses of killed *Br abortus* and *Br melitensis* followed by doses of living *abortus* in one subcutaneously in the other by the mouth Blood culture was negative in both on four trials They were killed and examined but all organs were sterile except that a culture was obtained from the lining membrane of the uterus of one goat which had aborted

Experiment II Three goats received by diverse ways—instillation into conjunctival sac ingestion inoculation under the skin and into the veins—large doses of living *Br abortus* Blood cultures were made twelve times all negative On the contrary in two goats one of which had already received several doses of killed *melitensis* and which were inoculated with living *melitensis* one yielded three positive blood cultures the other two The animals were killed and the organs examined *melitensis* was easily recovered from the lymphatic glands other organs sterile

Four other goats two of which had received doses of killed cultures of *melitensis* were inoculated with living *melitensis* Two blood cultures were taken from each all positive

The main differences then so far between goats infected with *abortus* and those infected with *melitensis* is that in the latter infection positive blood cultures are much more readily obtained

Thus —

26 blood cultures in 11 *melitensis* goats 17 positive

26 blood cultures in 6 *abortus* goats only 1 positive

Two pregnant goats were taken and one received an intravenous inoculation of *abortus* the other a similar one of *melitensis* The *abortus* goat aborted on the 35th day the *melitensis* goat on the 20th Both were killed and examined and cultures were obtained from spleen kidney and uterus in both. The experiment was repeated with two other goats and both aborted on the 17th day The germs were recovered from the foetus and from the goats when killed, and no difference could be made out

It will be seen from the above experiments that abortion was produced in goats as readily by *melitensis* which had been derived from known cases of undulant fever as by *abortus* derived from cows the subjects of contagious abortion.

If the animals are killed soon after abortion cultures can be obtained from all the organs but if not killed till some months later the blood and the organs do not yield positive cultures. The germs remain for the longest time in the lymphatic glands in connexion with the mammary glands and the mucous membrane of the uterus which is their habitat.

The author then discusses the question whether *Br. abortus* of the cow which is but rarely pathogenic for man, becomes capable of producing undulant fever in man by passage through the goat. His conclusion is that if this is so undulant fever without the goat would hardly exist.

D. H.

ASCOLI (M.) & SANFILIPPO (E.) Ueber Immunisierung der Ziegen gegen Mittelmeerfieber [The Immunization of Goats against Undulant Fever. — *Ztschr. f. Immunitäts- u. Experim. Therap.* 1928 Aug. 8. Vol. 57 No. 3/4 pp. 229-233 [10 refs.] (Med. Clinic, Univ. Catania.)

The authors contend that the best way to control undulant fever is to immunize the chief subject of the disease the goat. They consider that the method of detecting infected goats by agglutination tests and slaughtering such animals is too expensive and also difficult to carry out. Two pregnant goats aged 1 year and 10 months, were taken and immunized with four very large doses of *Br. melitensis* (up to the washing of 18 agar plates) at intervals of ten days. In one instance the bacteria were killed by heat in the other gold chloride was used as an antiseptic. Both goats stood the process well and there was no fever and little local reaction. Ten days after the last dose of the vaccine an infecting dose of two 72-hours agar cultures of living *Br. melitensis* was given by the mouth. Agglutination positive. Blood culture and culture of bone marrow sterile. Both goats remained well and both gave birth to healthy kids some weeks later.

The animals were killed one month after the birth of the kids and carefully examined. All organs were healthy and the *Br. melitensis* could not be isolated from any. A control goat which had not been immunized was given the same infecting dose and became ill and lost weight. It was killed and on post-mortem the lymphatic glands all over the body and especially those of the mammary region were markedly swollen and *Br. melitensis* was readily recovered from the glands and also from the bone marrow.

As a result of these experiments the authors consider that it is feasible to immunize pregnant goats by means of vaccine and in their opinion in this method lies the solution of the prevention of disease in man.

D. H.

BASTAI (P.) & ROTTA (C.) Sul significato clinico e biologico delle reazioni allergiche e delle agglutinzioni antimelitens in individui normali e nei malati di febbre ondulante. [The Clinical and Biological Significance of the Allergic and Agglutination Reactions in Undulant Fever Patients and in Normal Individuals.] — *Policlinico Sez. Med.* 1928, Aug. 1 Vol. 35 No. 8. pp. 393-422 [27 refs.] [General Med. Clinic, Univ. Turin.]

The melitine and abortine used in the authors' experiments were prepared by them in the following manner. Twenty-two strains of *Br.*

melitensis were sown in one broth tube and seventeen strains of *Br abortus* in another. After 36 hours flasks of broth are seeded with 1 cc. of the infective cultures and placed in the thermostat for 20 days then heated to 56° C. for an hour and filtered through a candle. They thus avoid using inactive strains.

They tested the intradermal reaction on 19 patients suffering from undulant fever proved by agglutination above 1:1000 (in one case to 1:6000) and by haemoculture. As controls they tested it on 72 healthy volunteers, or on patients recovering from diseases other than undulant fever. Three of the latter gave a marked positive and six a weak positive the remaining 63 a negative. The three positives were cases of tetany and cholecystitis, tuberculous adenitis and Dercum's disease, all giving a positive tuberculin reaction.

The authors tested the relations between the intradermal reaction and the agglutinating titres in various individuals including some who had had oral administration of vaccines and discuss the significance of the agglutination and intradermal reactions which are positive in subjects free from *melitensis* infection. These points cannot be dealt with in detail here but the conclusions may be summed up by saying that the intradermal reaction is constantly positive in case of infection by *Br melitensis* the instances in which it fails being so few as to be negligible. It is however not strictly specific, seeing that it is occasionally present even if weak in uninfected individuals. Those who have had vaccines orally or parenterally also react. Some of the apparently uninfected who give a positive may have ingested milk contaminated by *Br abortus* and that on more than one occasion and they would consequently not be exceptions since they would have undoubtedly have taken the vaccine orally.

H. Harold Scott

BURNET (Et.) La thermo-agglutination et l'évolution de l'espèce *Brucella* [Thermo-agglutination and the Development of the *Brucella* Species.]-Arch Inst Pasteur de Tunis 1928 June Vol. 17 No. 2 pp 128-146 [10 refs.]

By thermo-agglutination the author implies agglutination by heating an emulsion of the microbes in normal saline in a water bath at 90° C. to 100° C. the time required varying from a few minutes to one or even two hours. This phenomenon specially characterizes the strains known as *para-melitensis* and can be produced in *melitensis* by growing it in contact with *para-melitensis*: once acquired the property is fixed. This alteration of the physical character of the microbe does not affect its virulence but may alter the character of the growth in broth which may show a scum on the surface with stalactite formation resembling a culture of plague: there is no change in the appearance of colonies on agar plates nothing in the nature of rough and smooth.

The type *para-melitensis* i.e. thermo-agglutinable cultures is common being *melitensis* derived from human cases or from goats but rare among *abortus* cultures derived from cases of contagious abortion in cattle.

FAVELLI has already shown that cultures of *Brucella* can be rendered thermo-agglutinable by the action of immune serum. Burnet repeated these experiments: he succeeded in rendering two strains of *abortus* thermo-agglutinable by this means and also has rendered *melitensis*

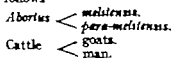
strains thermo-agglutinable by the action of normal serum and also by the action of certain antiseptics, such as formalin, iodoform and iodine. Bile also had the same effect but required very many subcultures the 20th gave sharp thermo-agglutination both with *abortus* and *melitensis*.

The author then puts the following question: Do the strains which have been rendered thermo-agglutinable in the laboratory possess the same properties as *para-melitensis* found in nature? These properties are that *para-melitensis* is readily agglutinated to 1/150 by normal human serum, and suspensions have a tendency to spontaneous agglutination: they are also bad antigens i.e. when inoculated into animals such animals only show a low titre of agglutination in their serum, whereas *abortus* and *melitensis* readily produce agglutinins when inoculated into rabbits.

Five strains—4 *melitensis* 1 *abortus*—were taken: these had been rendered thermo-agglutinable in the laboratory. These strains when inoculated into rabbits (before they had been modified by growth on immune serum) produced a high titre of agglutination: but after modification the four *melitensis* strains no longer did so but no change in this respect had taken place in the *abortus* strain. That is to say so far as antigenic properties are concerned, the *melitensis* strains after they had been rendered thermo-agglutinable reacted like natural *para-melitensis* strains, whereas *abortus* did not do so: thus *abortus* is seen to be more stable than *melitensis*.

In the opinion of the author the primitive type of *Brucella* is *abortus*: this is not pathogenic for man directly from cattle, but becomes so after passage through the goat. It is in the goat that *Brucella* retains its power of producing abortion and attains its power of producing undulant fever.

The author explains the few cases so far reported of undulant fever acquired directly from cattle as being cases of infection of cows by *melitensis* from goats and thence to man. The ordinary course is, as shown graphically as follows:—



D H

McALPINE (James G.) & MICKLE (Friend Lee). *Bacterium abortus* Infection in Man. The Results of the Agglutination Test applied to more than 10,000 Human Sera.—*Amer Jl Public Health*. 1928. May Vol. 18 No 5 pp 609-613 [4 refs.] [Storrs Agric. Exper. Station Storrs, Conn.]

For several years the Storrs Agricultural Experimental Station has tested by agglutination and complement fixation reaction a large number of dairy herds in Connecticut. It appears from the data obtained that 90 per cent. of the herds are harbouring *Br. abortus*. This would suggest that if *Br. abortus* is pathogenic for man there should be many cases of undulant fever in the State. With a view to throwing some light on this subject all sera sent in to the State Department of Health for the Wassermann reaction were tested for agglutination for *Br. abortus*. The antigen employed was made from four strains of *Br. abortus*. 48 hours growths on agar were used and were washed

off in carbolyzed saline and diluted to scale. This emulsion was mixed with the serum to make final dilutions of 1/25 1/50 1/75 and 1/100 and placed in the incubator for 48 hours at 37° C. one reading was made at this time and a second after the tubes had stood at room temperature for 24 hours.

10 157 human sera were tested of this number 63 or about 0.6 per cent gave a complete reaction in all four dilutions. On enquiry it was found that 18 of the persons had partaken of raw milk. In the authors view it is significant that of 17 females whose sera reacted 3 had previously suffered from two or more abortions and one was diagnosed as having uterine ulceration.

Although it is true that such sera are not perhaps representative of the general population yet it would appear from the figures obtained that so far as this investigation goes infection with *Br abortus* is not common in Connecticut State and this is borne out by the fact that very few cases of undulant fever have been notified.

D H

SIMONETTI (F) [Sur les rapports entre le *Brucella melitensis* et le *Brucella abortus* Recherches expérimentales] [On the Relationship between *Br melitensis* and *Br abortus* Experimental Research.]-*L Igieno Moderna*. 1928 Jan Vol 6 p 9 [Summarized in *Bull Office Internat d'Hyg Publique* 1928 Apr Vol 20 No 4 p 615]

In these researches on the *Br melitensis* and *Br abortus* the author employed two strains of each of these two varieties and studied them from the point of view of agglutination and fixation of complement. Sera for each strain were obtained from guineapigs which had been inoculated subcutaneously with a series of doses of a suspension of the bacteria in saline which had been heated to 60° C. for thirty minutes. The agglutination tests were carried out both with sera unheated and with sera diluted 1/50 in distilled water and heated to 65° C for half an hour. The complement fixation tests were carried out with the same sera and with the emulsions used to immunize the guineapigs as antigen.

The result of these researches was that under the conditions employed it was not possible to make out any difference between the strains of *Br melitensis* and *Br abortus*. Epidemiological studies had already demonstrated the connexion between undulant fever and epizootic abortion, and in view of the present work it would appear that the specific agent of the two diseases is one and the same.

D H

BROTZU (G) [Sur les rapports entre le bacille de Bang et le *Micrococcus melitensis*] [On the Relationship between *Br abortus* and *Br melitensis*]-*Boll d Scienze Med* 1927 Vol 5 [Summarized in *Bull Office Internat d'Hyg Publique* 1928 Apr Vol 20 No 4 p 616]

The author cultivated strains of these bacteria from goats (*melitensis*) and from cows (*abortus*). He found that when grown on Noguchi's medium (a small portion of guineapig kidney in ascitic fluid with a plug of vaseline) *Br melitensis* formed a white pellicle just below the vaseline whereas *Br abortus* did not or only a rudimentary one. As

regards strains of human origin, some behaved in culture as did *Br melitensis* (goats) and some resembled *Br abortus* (cows) the latter being possibly due to bovine infection.

It was noted that if the strains were cultivated for some time in this medium, certain changes took place for instance *Br abortus* ceased to grow on agar and only grew with difficulty in broth.

Br melitensis also acquired the property of thermo-agglutinability at a temperature of 90° C. a property which has been already shown by BURKET to appertain to *para-melitensis*. It was also noted that after several passages in Noguchi's medium, *Br melitensis* lost the property of producing a pellicle and thus came to resemble *Br abortus*. This last observation is in favour of the hypothesis that these two germs are simply varieties of one single kind of bacterium more or less differentiated by passage through different sorts of animals—goats, cows or man.

D. H.

VERCELLANA (G.). L'azione patogena del b. di Bang per il genere umano è dimostrabile sperimentalmente? [Nota riassuntiva. [La *Brucella abortus* Pathogenic for Man Experimentally?—*Giorn di Clin Med* 1928 July 20 Vol. 9 No 10 pp. 545-546. [Inst Gen Path Univ Parma.

The author has confirmed by experiment the findings of NICOLLE, BURKET and COXSEIL who in 1923 obtained negative results from injecting five individuals with cultures of *Br abortus*. Professor Vercellana inoculated four volunteers with 2,000 million organisms belonging to eight strains isolated from cow in a district where undulant fever is unknown. The virulence of the organisms for animals was proved experimentally on two goats. To other human subjects was given raw milk rich in bacilli from infected goats, also cheese and other food infected with the bacilli. The serum of the various individuals gave a slight agglutination with *Br abortus* after some days, but there was no sign of any constitutional disturbance in any of them, though they remained under observation for a long period.

H. Harold Scott

FAVILLI (Giovanni) & BOSCHETTI (Umberto). Different vitalità nelle agar-culture dei batteri della specie *Brucella melitensis*. [Vitality of Agar-Cultures of Organisms of the *Brucella* Group.]—*Sperimentale* 1928 Aug 1 Vol 82 No 5 pp 371-380 [8 refs.] [Inst. Gen Path Univ Florence

What may be designated the Vitality test will, if confirmed, help to differentiate *Br abortus* from the *B melitensis* and *para-melitensis*.

The authors put up cultures on agar of 36 strains of *Brucella*—18 of *Br abortus*, 10 of *Br melitensis* and 8 of *Br paramelitensis*—and kept them in the dark at room-temperature for two months. Fifteen of the *Br abortus* strains were from cows in a district free from undulant fever. After this interval they subcultured on to plates twice a month from these original cultures and found that abundant normal growth was still obtained from all the *Br abortus* strains up to 3½ months after five months two were dead and one gave a poor growth, the remaining fifteen grew abundantly. Of the *Br melitensis* cultures only three gave

a good growth as long as four months after 4½ months four gave a weak growth the rest having died only one grew at all and that feebly after five months. Of the *paramelitensis* two gave a good growth and three others a poor one after 3½ months only one strain lived over 5 months and this yielded but a feeble growth. Protocols are shown with details from which it appears that *Br abortus* has a much greater vitality than *Br melitensis* and that *Br paramelitensis* has still less

H Harold Scott

CARPENTER (C. M.) & BOAK (Ruth) Summary of Some *Brucella abortus* Studies.—*Cornell Vet* 1928 Apr Vol 18 No 2. p 204 [New York Vet College Cornell Univ Ithaca N Y]

I Thermal death point of *Br abortus* in milk

Human bovine and porcine strains of *Br abortus* grown in milk were exposed in bulbs at temperatures of 140° 142° 145° and 150° F for various intervals of time in a carefully controlled water bath.

The cultures were tested for viability by culture and by guineapig injection the latter method was found to be the more delicate one. No cultures were viable after 20 minutes exposure to a temperature of 140° F

II Examination of Routine Wassermann Serum for *Br abortus* agglutinins

3 053 samples of sera were examined 209 or 6·8 per cent gave slight or complete agglutination of *Br abortus* at dilutions varying from 1/15 to 1/1,215 The histories of these patients are being followed up

D H

HUDDLESON (I Forest) & ABELL (Elizabeth) Behavior of *Brucella melitensis* and *abortus* toward Gentian Violet.—*Jl Infect Dis* 1928 July Vol. 43 No 1 pp 81-89 [10 refs] [Michigan State College East Lansing]

It has already been noted by one of the authors that the growth of *Br abortus* is inhibited by gentian violet and the present paper records further work done with the view of using this property as a means of separation of the various strains of *Brucella*.

A table records the effects of gentian violet—in dilutions of 1/50 000 1/100 000 and 1/250 000—on the growth of sixteen strains of *Br melitensis* derived from various sources some from human cases and some from goats None of these strains were inhibited in their growth by the dye in the dilutions used but a few showed some inhibition by the 1/50 000 dilution

On the other hand when twenty-one strains of *Br abortus* of bovine origin were tested with the same dilutions of this dye it was found that whereas one only of the strains was inhibited by a dilution of 1/250 000 a 1/100 000 dilution retarded the growth of all, and a dilution of 1/50 000 completely inhibited the growth of seven strains and retarded the growth of the others.

Thus the authors conclude that the growth inhibiting action of a 1/50 000 dilution of the dye is nearly sufficient to serve as a means of distinguishing this variety of the genus *Brucella* from the variety *Br melitensis*

Twenty-one strains of *Br. abortus* of human origin were then tested and were found to fall into two groups as regards their resistance to the action of gentian violet—one group were very markedly inhibited in their growth by the dye and the other group less so but still distinguishable from the *melitensis* group and comparable to the *Br. abortus* of bovine origin. The strains in this latter group came from Michigan, California and Rhodesia—none of the strains in Group I came from Michigan.

Twelve strains of *Br. abortus* of porcine origin were tested with the dye and were found to be specially susceptible to its action even more so than Group I of the series of human origin, and by this means it may be possible to assist in differentiating *Br. abortus* of porcine origin from that of human, although one or two of the strains of human origin and one of bovine were identical with the porcine strains in their susceptibility to the action of the dye.

The authors therefore are of opinion that this action of gentian violet may be of assistance in distinguishing *Br. melitensis* from *Br. abortus* and also in separating the different varieties of the latter.

D. H.

MCALEDYNE (James G.) & SLANETZ (Charles A.) Studies on the Metabolism of the Abortus-Melitensis Group. 4. Effect of Various Concentrations of Carbon Dioxide.—*Jl Infect Dis* 1928. Sept. Vol. 43 No 3 pp. 232-240. With 1 chart [22 refs.] [Storrs Agric. Experim. Station, Storrs, Conn.]

In previous papers the authors have shown that the *abortus melitensis* group can be divided into two well marked sub-groups by means of the action on glucose. *Br. abortus* of bovine origin cannot ferment this sugar, whereas *Br. abortus* of porcine and human origin and strains of *melitensis* can do so.

The results of the present research show a similar grouping—thus strains of *Br. abortus* of bovine origin require an addition of 5 to 10 per cent. CO₂ for the promotion of luxuriant growth, whereas *Br. abortus* of human and porcine origin and strains of *melitensis* are inhibited by low concentrations of this gas. The authors also show that this effect of CO₂ is not due to any alteration in the reaction of the medium.

D. H.

FATILLI (Giovanni). Sulla patogenicità del bacillo di Bang per l'uomo.—*Bol. d. Istituto Sieroterap. Milanese* 1928. Mar. Vol. 7 No. 3 pp. 161-166 [9 refs.] German summary p. 168 [Inst. of Gen. Path. Univ. Florence.]

JENSEN (J. P.) Spodilytite bacillo abortus (Bang).—*Hospitalvidensk.* 1928. June 14. Vol. 71 No. 24 pp. 637-648. With 5 text figs. [Copenhagen District Hosp. Frederiksberg.]

BASTAI (Pho). Sulla questione della natura della infezione melitense umana di origine ovina e bovina.—*Bol. Istituto Sieroterap. Milanese* 1928. June Vol. 7 No. 6 pp. 305-310 [General Med. Clinic Univ. Turin.]

DA RIX (O.) & WEIDENBERG (M.) Studio comparativo del quadro ematologico nelle infezioni sperimentali da *Br. brevis* da *Br. bang*.—*Pathologica.* 1928. July 15. Vol. 20 No. 441 pp. 347-361 [103 refs.]

REVIEWS AND NOTICES

NÖLLER (W) Die Züchtung der parasitischen Protozoen [The Cultivation of Parasitic Protozoa.]—*Handbuch der pathogenen Protozoen* (Prowazek) 1928 Bd III Lief 12 pp (II+) 1815–1967 With 38 text figs. (Leipzig J A Barth) [Price Rm 16–]

This latest instalment of the late Dr PROWAZEK's so-called Manual contains, in the compass of some 152 pages a valuable survey of modern methods for the cultivation of parasitic (including some commensal and coprozoic) protozoa. Though mainly a compilation from the relevant literature it is interspersed with the author's comments enriched by his own experience and arranged in accordance with his personal views. A good bibliography of over 26 pages (comprising some 625 entries) shows the range of his reading while the circumstance that his own name appears in the text more frequently than that of any other worker affords sufficient indication of the personal touch.

Exclusive of the bibliography (Section F) the treatise is divided into five unequal main parts (Sections A–E). Section A—less than 2 pages—is a general introduction and is followed by section B (pp 1818–1833) which is subdivided into (1) the cultivation of "parasitic rhizopods and (2) the media hitherto used for cultivating these organisms (including the coprozoic amoebae). The information here given is on the whole accurate but it is not quite up-to-date and does not reveal an extensive first-hand knowledge of the subject or full appreciation of some of the technical difficulties involved.

Section C (pp 1833–1933) deals with the parasitic flagellates and is divided into two main parts: (I) the cultivation of intestinal forms (12 pages) and (II) the cultivation of blood flagellates and their next of kin (88 pages). The unequal space allotted to these two different groups exemplifies the author's bias. When dealing with the intestinal flagellates he lists the chief species hitherto cultivated and gives the formulae for various culture-media which have already been more or less successfully employed. But when he comes to the blood-inhabiting flagellates—with the cultivation of which he is himself intimately familiar—he really lets himself go and pours out a miscellaneous stream of useful information. All the illustrations belong to this section and its variegated character can be seen from the headings of the subsections and the order (*sic remia verbo*) in which the several subjects are treated. There are 12 subsections in all, and they comprise: (1) general remarks on the mode of life of blood flagellates; (2) the history of their cultivation; (3) the constituents of the culture-media suited to the cultivation of such organisms; (4) the physico-chemical conditions necessary for their growth; (5) the technique of making cultures and the behaviour of the organisms in artificial media; (6) a list of the most important culture media; (7) the cultivation of the trypanoplasms; (8) the cultivation of the leishmanias and leptomonads of vertebrates; (9) the cultivation of leptomonads from invertebrates and plants; (10) the cultivation of crithidias proper to invertebrates; (11) the cultivation of trypanosomes from the blood of vertebrates and of their developmental forms from invertebrate vectors; (12) the culture-media for blood flagellates and their kin (preparation, inoculation maintenance). The author's methods of making plate-cultures of trypanosomes (and allied forms) on blood-agar are here described in minute detail while the accompanying illustrations even show such objects as Petri dishes and Bunsen burners and a platinum loop (unfortunately invisible in the half-tone reproduction) and indicate—beyond all reasonable misunderstanding—exactly how a blood-agar plate may be inoculated upside-down (fig 32). To anyone wholly ignorant of bacteriological and protozoological technique such particulars should prove invaluable.

Section D (pp. 1833-1837) deals with methods for cultivating the "Coccidia and Haemosporidia," and section E (pp. 1833-1840) summarizes (not too fully) what is now known about the cultivation of "parasitic Infusoria."

The author takes throughout—when his own claims to priority are not concerned—a liberal view of the alleged achievements of others; and accordingly he sometimes accepts and quotes methods and media which are not yet generally approved. In his opinion, all experienced workers recognize that a method of cultivation may succeed with one investigator though it invariably fail in all other equally competent hands. Consequently, he records—to give examples—LYNCH's method (1915) of cultivating *Trichomonas* and CUTLER's methods (1918) for *Eutima* and *Isotricha*—and he rebukes more critical workers (especially the reviewer) who, after repeated trial, have satisfied themselves that *T. axenidis* cannot usually be cultivated in broth acidified with acetic acid, and that *E. histolytica* is uncultivable in a watery extract of human blood-clot incubated at 23-30° C. The reviewer—having no axe to grind—is content to let time decide whether the liberal or the conservative interpretation of these and various other similar claims be scientifically the sounder. He merely wonders mildly now why numerous earlier successes are not treated by the author with equal respect—why for instance there is no mention of the achievements of those who once "succeeded in cultivating *E. histolytica* in haemolysed infusion and on ordinary nutrient agar at room-temperature? If the author's standpoint be taken, one must believe that this parasite was cultivated by various irrational and apparently impossible methods long before BOECK and DUBOIS-LAV attained their unquestionable success in 1924.

A few other minor points deserve critical notice. For example, the author's views on nomenclature are not always easy to understand. He calls the trichomonad of the human intestine by the novel name of *Trichomonas intestinalis* DAVARKE 1880 (p. 1834), though whether by misprint mistake or design, is not manifest, while he designates (p. 1832) the herpetomonad of the house fly *Herpetomonas muscae domesticae* STREIN 1878, with synonym *H. muscivora* (LINDY 1856) HERT 1891—a truly remarkable addition to the nomenclature of this unfortunate flagellate. Acceptance (p. 1837) of the specific name "*macrophi*" (for the *Trichomonas* of *Macropus*) is surely to be deprecated. One can well understand how so strange a genitive case might be used by a Japanese, but it is hard to conceive how anyone of European education could copy him. On p. 1840 under *Embadomonas spec. nov.* (which appears to mean *species novae*, though *spec.* and *nov.* are the accepted biological abbreviations for *species* and *novitates*) the author rather hypercritically queries the species of organism described by WATSON as "an English frog." The description was not, perhaps, the best possible—but as there is only one native English species, the indication is not altogether unintelligible. It may also be noted that several hitherto unpublished observations by NICHOLLS are incidentally recorded, and that the author occasionally dates his own methods not from their date of publication, but from the time when he first conceived them (e.g. on p. 1833 we find "Older's serum-agar 1916 published 1922"). On p. 1879 moreover a "new species" of *Leptomonas* is instituted—albeit in circumstances of some dubiety. It is a pity that writers of text-books and similar works cannot avoid proposing such new species incidentally—as this practice invariably leads to trouble.

Despite these and other minor blemishes, however, this perspicaciously annotated compilation will be of real value to all engaged in research involving the cultivation of parasitic and commensal protozoa—for it has been made with evident care and it is throughout commendably free from misprints and misquotations. While the instructions given for the cultivation of blood-inhabiting protozoa are probably better and more complete than any yet published, and therefore deserve the attention of all serious students of this difficult subject.

Clifford Dobell

[The reviewer cannot refrain from seizing this opportunity to enter a protest against the manner of publication of the *Handbook* of which the present memoir forms a serial part. This work began—professedly as a compendium of the pathogenic protozoa in 1912, and subscribers were then led to expect that it would be quickly completed in two volumes at a moderate price. But the work has long since ceased to be a manual—in any sense—and has become a periodical. The original editor (and part author) died 13 years ago many subjects have already been treated several times by different hands and a large proportion of the space has been devoted to Chlamydozoa and to the Spirochaetes and other organisms which—as the present editor himself confesses—are not protozoa at all. Vol I (514 pages) cost originally about 28 shillings and is now out of print. Vol II (524 pages) now costs about £2. Vol III—which subscribers did not originally bargain for and which is not yet finished—has already covered nearly 1 000 additional pages at a present cost of roughly £3. (During issue it has been variously priced by the publishers at anything from 58 to 200 marks.) The publishers now announce that a final section with the much needed index, will appear shortly. They first made this announcement in 1914—since when the work has been doubled in size and cost—and have repeated it before the issue of each subsequent instalment. Without its index the book is almost unusable as some articles are duplicated or even triplicated and subjects follow one another in no recognizable order through some 2,000 pages. Each time a new instalment appears, subscribers are thus faced with the option of buying yet one more part—with the gradually receding hope of getting the index and completing the work—or of ceasing to buy new parts and so being saddled with a fragment of a book whose cost is not commensurate with its present-day protozoological value. Every year brings new results and consequently many of the articles now possess little but historical interest and there is thus no obvious reason why this publication—by continued repetition, revision, supplement, and still further extension of its purview—should not go on for ever. It is greatly to be hoped therefore that the publishers will this time keep their promise—first made 14 years ago—to finish off this handbook and supply subscribers with the long-overdue and indispensable index to its disorderly and heterogeneous contents.—C. D.]

ACTON (Hugh W.) [Lt.-Col. I.M.S. Professor of Pathology & Bacteriology Calcutta School of Tropical Medicine & Hygiene] & KNOWLES (R.) [Lt.-Col. I.M.S. Professor of Protozoology Calcutta School of Tropical Medicine & Hygiene] *On the Dysenteries of India. With a Chapter on Secondary Streptococcal Infections and Sprue*—pp. xiv+178. With 5 colour plates & 33 figs. 1928. Calcutta. Thacker Spink & Co. [Rs. 7/8.]

In this book the dysenteries of India receive complete survey, critical analysis and excellent illustration. The ascertained facts concerning them which must be known to and acted on by clinician and sanitarian if competence in their work is their aim, are lucidly recorded and discussed by two authors who have valid claims to be heard on the subject. They note that the advance in knowledge of dysentery which resulted from the war and post war years has not yet been generally incorporated in the teaching of medicine in India. The erroneous belief that most of the dysentery of India is amoebic is still widely held there—we would add, generally held and as erroneously for the dysentery in most of the tropics outside India.

The authors themselves have taken the leading part in correcting this error in India. They frankly emphasize that this book is a compilation—a piracy—taken chiefly from the work of MANSON, BAHN, MARRIAN, PERRY, DOBELL, LOW, FLETCHER, JEPPE, HARVEY. But it may be that their own knowledge gained in original research on the dysenteries of India

while endowing them with trustworthy ability to select from and thus endorse the original work of others, also entitles them to express their views in any comprehensive treatise on the subject, such as this book is. They point out that all the work on dysentery in India (that country's third most important cause of mortality) has been done by individual and isolated workers—Timothy Lewis and D. D. CUMMINGHAM in earlier days and more recently Leonard ROGERS (to whom this book is dedicated) a select band, to whom we may now join Acton and Knowles. They note however with surprise and perhaps some hint of regret that the dysenteries of India have not yet been the subject of an organized research commission. "We may be sure that the only organized research commission tolerable to original workers is one in which an individual original worker isolated by his own compelling idea of what he wants to do is given all the skilled obedient assistance, and ready access to material, he may require. He is not to be hampered by other minds, but helped with more hands and then let alone. In fact, however most commissions have but found again, and repeated with a thicker utterance the discoveries and conclusions of individual and isolated workers."

Once upon a time the word "Mesopotamia" gave comfort. Now in medicine, we have got the word "Commission" and it is still not clear that its blessing is much less futile than that of the older word. Meanwhile the authors' work has done much to make the task of the Commission (which may be upon India any day) an easy one. Their book has a wider appeal and usefulness than in India only.

H. M. Hanschell.

BOLETÍN DEL INSTITUTO DE CLÍNICA QUIRÚRGICA. Buenos Aires, 1928. Vol. 4 Nos. 28-31. 970 pp. With numerous illustrations. [Also issued as *la Revista Soc. Argentina Patología Regional del Norte Santiago del Estero* 7 8 y 9 Mayo 1928. 970 pp. With numerous illustrations.]

In dealing with a work of this size, nearly 1 000 pages and 120 collected papers, it is not possible to do more than mention some of the most important. The plates are excellent, the illustrations generally of a high standard and the print clear. The binding may be regarded, according to the reader's view as villainous or non-existent, which, though a common fault in foreign publications of the present day is a pity in this instance where the majority of the contents are of interest to some branch or other of science.

To speak in more detail of some of the matters of particular importance to tropical workers.

Attempts at reproducing leprosy experimentally in a monkey were made by Professor FRANCHINI. It is true that lesions were produced by supra-orbital inoculation of a leproma rich in bacilli into a *Macacus sylvius* but no generalization took place. On the contrary spontaneous cure resulted in a comparatively short time, two months or less. MARQUEZ DA COSTA has an article on *Verruga peruviana* which gives a good review of the subject but brings forward no new facts. In the second section of the book the subject of malaria is dealt with. Of the 23 papers in this part several are of local interest only and do not call for comment. Others may be referred to here. Drs. RICHARD QUIETA and NÚÑEZ, having noticed that no anopheline larvae were to be seen in the canals conveying the products from the crushing mills of sugar factories, undertook experiments to determine whether any of the constituents were particularly larvicidal and, if so, whether they could not be so used more generally. Fuel oil molasses proportion of extract needed was so high that commercially its use would be out of the question. An interesting series of experiments was carried out by Dr. ANTONIO BARRERI as to the larvicidal action of fluorescent

substances under the action of sunlight that is the photodynamic action of light as a larvicide. He tried many preparations several of which were active. The best appeared to be Bengal Red which in a dilution of 1:500 000 or even in some cases 1:1 000 000 led to the destruction of the larvae when exposed to sunlight for four hours. If the sky was clouded the time for effective action was considerably prolonged.

DRS MERZBACHER and BIANCHI contribute two papers. The first is a consideration of the replies to a series of questions sent to 400 medical men as to the effects of paludism on syphilitic diseases. They were generally to the effect that the evolution of syphilis was favourably modified. Not too much reliance can be placed on such a general statement as the question depends on so many factors—the prevalence of the two diseases the stage of the syphilis and above all, the personal factor of the doctor and the treatment he adopts. The second is an account of the authors own experience regarding the effect of malaria on nervous forms of syphilis. They find that syphilis uncomplicated by malaria gives twice as many positive Wassermann reactions as it does when associated and that the colloidal reaction with the cerebrospinal fluid is profoundly modified. The inference to be drawn is that the results of these tests must be cautiously interpreted in malarious districts.

Dr CAPELLE relates four cases of malaria three of *P. vivax* and one of *P. malariae* treated with plasmoquin three with success in the fourth a child a little over a year old the malarial parasites seemed to disappear but the general state did not improve and this is ascribed to inherited syphilis. Dr MAZZA writes on the action of the same drug on Haemoproteus and finds it most successful on these gametocytes and also on avian trypanosomes. Other quinine substitutes in malaria were tried Urotropine (which OLIVERA had reported as being most effectual) was given by Dr J. D. LUMA to 47 patients four of them quartan the rest tertian. Ten cc. of Schering's solution were injected daily for 8-12 days but proved in the author's hands to be ineffective. The parasites were possibly reduced in number in some cases, but the attacks of fever were uninfluenced. Drs MAZZA and TRELLES employed the bark of *Aspidosperma quebracho blanco* var. *pendula* in tablets with marked success in a certain number of patients others did not react and to them quinine had to be given. It might be useful in some who are intolerant to the latter. The dose employed was six tablets daily for 5 days with a repetition of the course after an interval of the same duration. Dr RAIMONDI mentions a case of malarial psychosis melancholia with delusions, associated with quartan parasites which cleared up on administration of quinine. One case of urticaria and four of purpura with malaria also reacted well and promptly to quinine. Drs R. COSSIO and A. A. ALBARRACIN tested the rate of sedimentation of erythrocytes in 29 cases of malaria and found it increased while the patients were under going treatment with quinine.

Section III on *Dysentery and Diarrhoeic conditions* contains little of importance. One case of diarrhoea associated with the presence of *Trichomonas hominis* in very large numbers cleared up when given Yatren.

In Section IV on *Leishmanial affections* Drs. MAZZA and BERNASCONI contribute a paper on leishmaniasis complicated by invasion of the pharynx and, more particularly the larynx. The paper is illustrated by good photographs and microphotographs demonstrating the pathology of the condition. All proved very resistant to treatment with tartar emetic. In this connexion mention must be made of a case described by Dr BORZONI of a woman with cutaneous leishmaniasis of the right forearm with enlarged axillary glands and spleen. In smears made from the latter two situations Leishmania were present in large numbers metastasis by the parasite blocking the reticulo-endothelial system. The haemohistioblasts in the spleen smear showed them in abundance. The author mentions that he has frequently seen cases of American cutaneous leishmaniasis *Leishmania brasiliensis* with mutilating lesions of the face the buccal cavity the oesophagus and the larynx.

In the section on *Ophthalmology* there are two papers one on Trachoma, the other on a tumour (plasmacytoma) of the conjunctiva and cornea, neither of which is of special interest to readers of the *Bulletin* though of value pathologically.

In the sixth section devoted to *Infective Diseases* there are two papers on pulmonary and bronchial spirochaetosis. These are dealt with in greater detail under the appropriate sections of the *Bulletin*. Another relates severe corneal complications occurring in measles in particular hypopyon, infiltration, and ulceration. Five cases are detailed and since they all occurred in the hot months the author Dr R. G. OLLI, believes that the climate causes an exaltation of the virulence of the causative organisms [whatever they may be] added by faulty hygiene and the precarious mode of life of the people.

In the *Hæmatological* section (VII) is a paper of medico-legal interest regarding the blood-grouping of parents and children for the determination of paternity and showing its limitations. Dr MAZZA and BRANCHI made a comparative study of the blood of persons at a height of 1 200 metres above sealevel and the same at 3 500 metres. Their results confirm those already given by BANCROFT.

Several papers are included on the *Mycological* infections of South America which are of special interest to systematists rather than to clinicians. Four of these deal with *Monilia* and *Blastomycotic* infections of the respiratory tract. Several papers are comprised in the section on *Parasitology*. Nearly all these deal with descriptions of parasites, protozoal and helminthological, found in animals, reptiles, birds and some of the lower mammals. Apart from these a paper by F. L. NIFFO on the "Morphological Aspects of *Schizoscyrenus cruzi* in the Body of its Hosts and in Culture Media" is illustrated by some beautifully executed coloured plates.

A case is recorded of Spider bite which terminated fatally in an infant of 8 months. When seen on the fifth day after infliction of the injury the site of the bite the palm of the hand, presented a large necrotic ulcer but without any hæmorrhage or purulent discharge. There was no lymphangitis, but the constitutional disturbance was great—fever (29.3° C) tachycardia (155) and dyspnoea (50) vomiting of bilious matter passage of bile-stained urine. The pupula were inactive to light and convergence groups of muscles were involved in spasmodic but rhythmic movements, most marked on the side of the lesion. There was some generalized lividity and oedema which increased (Aguilar's "white necrosis") a sign of bad augury. In spite of treatment the ulcer extended in size and depth and death occurred in coma on the fifteenth day. The poison was clearly cytolytic, necrotizing, and neurotoxic. The species of spider responsible was not discovered.

The remaining sections, namely those on pharmacology, materia medica, medical statistics and chromatology and American medical history, ethnography and anthropology do not call for comment.

H. Harold Scott

MARCHIASAVA (Ettore) La perniciosità nella malaria. Monografie Medico-Chirurgiche d'Attualità Collezione del Policlinico [Pernicioussness in Malaria.]—66 pp. With 3 graphs in text & 21 figs. on 1 plate. 1928. Roma Casa Editrice Luigi Pozzi [L.12.]

In this monograph, issued by the *Policlinico* Marchiasava states his belief in the plurality of plasmodial species and of their endocorporeal site. Pernicioussness is for all practical purposes an attribute of *P. falciparum* and its morphology sporing sometimes without pigment formation, its sexual cycle and phagocytosis are dealt with. The clinical aspects of the febrile curve and general state are clearly shown. Pernicioussness is attributed to freer multiplication and greater toxicity than with the other species and in various forms—nervous, anginous, syncopal, hæmorrhagic, choleraic, dysenteric, scarlatina and hæmoglobinuric—come under

survey as well as the rare larval forms in which fever is absent. An indication of approaching perniciousness is found in abundant subtertian rings in the cutaneous blood. After effects of perniciousness are intense anaemia and grave residual nervous symptoms implicating brain, bulb, cord and nerves. Diagnosis and prognosis are considered and satisfying sections follow dealing with pathological anatomy, prophylaxis and treatment. A plate of figures accompanies the book, remarkable for its economy of detail and striking clearness. The monograph puts into compact form the valuable life-long experience of a master of malariology.

Clayton Lane

MARTINI (Erich) *Beiträge zur medizinischen Entomologie und zur Malaria Epidemiologie des unteren Wolgagebiets*. [Contributions to Medical Entomology and to Malaria Epidemiology of the Lower Volga.]—*Abhandl. a. d. Gebiet d. Auslandskunde Hamburg Univ.* 1928. Vol. 29 (D. Med. & Vet. Vol. 3) pp. vi+134. With 21 text figs., 42 figs. on 14 plates and 3 maps. 1928. Hamburg. Friederichsen, de Cruyter & Co. m. b. H. [M 12.]

The author visited the lower course of the River Volga and describes the country through which it flows and some of the characteristics of the climate. He passes on to a systematic account of the mosquitoes and other biting flies which he met, and it is clear that he devoted great attention to these insects: the species of *Aedes* which breed in the wet meadows and in salt pools in the steppes must be a very grave pest in summer. The second half of the book deals in further detail with the biology of the species of *Anopheles*, their relation to malaria, and the great epidemics of that disease which occurred in 1922 to 1924.

The climate is dealt with, but the facts quoted were not originally collected with reference to the present inquiry. One would like to know what difference in climate exists between the hilly west bank and the grassy meadows to the east of the Volga; we should like a number of facts about the temperature of marsh water and the annual cycle of humidity in a cowshed. It is topics of this sort which are really relevant. But the author is content to give us the generalizations of meteorology and small scale maps showing mean isohyets and isotherms sweeping across the whole of Eastern Europe in a familiar (and rather conventional) manner. For these deficiencies he cannot be blamed: he has given us the best he could in the present state of human ignorance. The blame rests on every entomologist who is content to swallow meteorological summaries and forgets that few of the insects live in a white ventilated screen, and that small local differences in climate are large enough to affect fauna and flora.

Measured in terms of entomology, the problem of malaria on the lower Volga was simple: for only two species of *Anopheles* occurred, *maculipennis* and *bifurcatus*; the first of these was thought to be the important vector. It is fortunate indeed for the inhabitants of the Volga region that they live a trifle to the north of the range of that dangerous species *A. superpictus* which would otherwise make its home in the little streams that run down the hilly west bank of the river. The post-war epidemics of malaria are discussed, and the available data examined. It appears that a very great increase of malaria occurred in 1922 and the two following years, and that this was due to hunger and economic factors rather than to climatic factors or increase in the number of *Anopheles*. But it seems that the epidemiological facts for different years are not really comparable and that they will not stand rigorous examination.

The reviewer has failed to discover the date of Professor Martini's visit to the Volga or how long he spent in the country or how widely he travelled in it. His illustrations are good.

P. A. Buxton.

BUCHANAN (R. E.) [Ph.D. Dean of the Graduate School, Professor of Bacteriology & Bacteriologist of the Iowa Agricultural Experiment Station Iowa State College] & FULMER (Ellis I.) [Ph.D., Professor of Biophysical Chemistry Department of Chemistry Iowa State College] **Physiology and Biochemistry of Bacteria. Volume I.—Growth Phases Composition and Biophysical Chemistry of Bacteria and their Environment and Energetics.**—pp. xi+516 With 78 text figs. 1928. London Bailière Tindall & Cox, 8 Henrietta Street Covent Garden, W.C.2. [34s.] [Review appears also in *Bulletin of Hygiene*]

Recent years have witnessed a notable output of books dealing with various aspects of bacteriology some of them covering or attempting to cover the whole ground of the subject after the fashion of an ordinary text-book, some of them having the nature of a monograph or a collection of monographs. The present volume occupies an intermediate position. It is the first volume of a text book dealing with the physiology of bacteria, their properties and activities as living things, and especially with those aspects of their behaviour which are susceptible of study by the more exact methods which physics and chemistry have introduced into biological science. Indeed it would be true to say that the present volume tells us a good deal about physics rather less about chemistry and relatively little about bacteria but that is only because the application of such methods to the study of micro-organisms is in its infancy and a book which points the way to an unexplored country may be more valuable than one which provides a description of a well-charted territory.

The authors have been at pains to indicate clearly the kind of methods which may be used to measure growth-rates and death rates in bacteria their metabolic processes their physical properties when in suspension, and their energy exchanges. The principles which underlie these methods are discussed in some detail and a free use of graphs will be welcomed by those who realise too late, the inadequacy of their mathematical training. Some useful monographs are included, and there is an excellent bibliography.

This volume and its implied successors will, we believe be welcomed by all teachers of bacteriology. The information which it contains is at present scattered in various text books and throughout a large number of scientific journals and it has been very difficult to indicate to students where they should look for information on these particular aspects of their subject. The collection of the relevant facts in a single book fills a real gap in bacteriological literature.

W. W. C. Topley

SANDU (Damodar Vasudeo) [G.P.A.C. (Bom.) L.M.S. (Homeo) etc.] **Indian Therapeutics. Dealing with the Comparative Diagnosis, Ayurvedic Materia Medica, Dietetics, Prescriptions, etc., for Students and Practitioners.** 2nd Edition. Revised and Enlarged—pp. vii +147 1928. D.K. Sandu Bros. Chembur Bombay.

The famous Dean Hole was once asked to give his opinion of a certain book. His reply was "If it is the kind of book you like you will like it and no doubt the strict followers of the Ayurvedic system of medicine will derive comfort and information from it." Indian Therapeutics. The system of diagnosis in Ayurved is described at length with details of the principles upon which the system is founded. It is stated that the ancient Rishis were acquainted with the endocrine glands and their secretions. The main portion of the book is a catalogue of diseases, symptoms, drugs, prescriptions and doses. Under the chapter on "Vegetables" we find "Ascorbic—cow's urine." Gout—cow's urine castor oil. There is a table of the vitamin content of various foods and an obstetric calendar. The printing is not very good and there are too many errors in spelling.

J. H. Tull Walsh.

TROPICAL DISEASES BULLETIN

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[No. 2

CHOLERA

- i. GRAHAM (J D) *Le choléra dans la Présidence de Bombay en 1927* [*Cholera in the Bombay Presidency in 1927*].—*Bull Office Internat d'Hyg Publique* 1928. Aug Vol. 20 No 8 pp 1209-1211
- ii. — *Sur le choléra au Bengale en 1927-1928* [*Cholera in Bengal, 1927-28.*].—*Ibid* pp 1212-1215

i. During 1927 there was a serious epidemic of cholera in the Bombay Presidency especially in the south and central districts. Between the 20th February and the 29th of October 50 024 cases were recorded with 21 319 deaths. A number of doctors and sanitary officers were sent out to deal with the outbreak and the usual measures for treatment and disinfection were carried out. Anti-cholera vaccination was largely employed and oral bile vaccine was also used.

ii. This is a brief report of the occurrence of cholera in Bengal during 1927-28 with tables which give the death rate and the distribution of cases in the various districts.

J H Tull Walsh.

ROGERS (Leonard) *The Incidence and Spread of Cholera in India, Forecasting and Control of Epidemics.*—*Indian Med Res Memoirs Supplementary Series to Indian Jl Med Res* 1928 Mar No 9 175 pp With 13 charts & 21 maps in text. [Summary appears also in *Bulletin of Hygiene*]

The general history of cholera in India is traced from the beginning of the 19th Century and from 1877 (when the necessary statistics are first available) to 1922 the monthly mortality data have been analysed in detail. These figures are examined in conjunction with several factors that may have a bearing upon the rise and fall in incidence e.g climatic conditions. The first section of the paper is devoted mainly to the proof of the author's thesis that the seasonal incidence of cholera is most closely related to the variations in the absolute humidity and that cholera never becomes widely epidemic until the absolute humidity rises above 0.400. Why a combination of low temperature and great dryness should check cholera prevalence is still an unsolved problem. In the later sections of the paper the statistics are carefully examined for each division of the country. It is concluded

that the most extensive and typically epidemic areas include the Punjab the Northernly Sind and Gujerat divisions of Bombay Presidency and the Central Provinces, while endemic areas include Bihar the sub-Himalayan divisions of the United Provinces, Bengal, Assam and Orissa.

Deficient autumn rain due to early termination of the south west monsoon, especially when followed by great diminution of the scanty winter rains resulting when extreme, in famine conditions is the most important factor in predisposing to increased cholera incidence in practically all parts of India through producing scanty and impure water supplies. Note is made of the tendency for a year of great epidemic prevalence to be followed by unusually low cholera incidence due to reduced susceptibility of the remaining population. The second great factor in addition to failure of the rains is the enormous movement of millions of persons yearly in connexion with innumerable pilgrimages. The pilgrims both disseminate the disease broadcast within the endemic areas and also frequently carry it from the endemic to the epidemic divisions and provinces. This movement is discussed very closely.

The conclusion is that the very close relationship shown in nearly every part of India between low autumn and winter rainfall, and the winter absolute humidity and increased cholera, together with the influence of pilgrimages, to and from places in the endemic areas more especially and the relation of cholera in one area to that in surrounding ones, should in future enable fairly reliable forecasts to be made of the probable incidence of cholera in any province. When the conditions are such that there is great danger of the spread of cholera, pilgrims should be inoculated before starting on their journey.

[The discussion of all these factors is so full that it cannot be adequately abstracted and should be read in the original.]

A. B. Hill.

KUANG (Yang Ting) [Problems of Cholera in China and Japan.]—*Jl Oriental Med.* 1928. Sept. Vol. 9 No. 3 [In Japanese. English summary pp. 29-34 3 refs.]

The author considers the serious problems of cholera in China and Japan and makes many suggestions for dealing with them. Among them are (1) an intensive study of endemic areas in the Yangtze Valley (2) removal of causes—control of water works, sterilization of wells, etc. (a beginning has been made by the Shanghai Chinese Health Authorities) (3) mass vaccination and vaccination of each passenger leaving for Japan or Manchuria. As an Appendix the author gives the rules for dealing with cholera in ships, as formulated at the International Sanitary Convention, 1926.

J. H. T. W.

AUDIBERT L. *Épidémie de choléra en Indochine en 1926-1927* [Cholera in Indo-China. —*Bull. Office International d'Hyg. Publique* 1928. Mar. Vol. 20 No. 5 pp. 692-701]

The author describes the various outbreaks of cholera in the provinces of Indo-China. The mortality was not very great and vaccination was carefully carried out. During 1928 2,172,784 inoculations

were performed among a population of about nineteen millions. The author considers that anti-cholera vaccination should be performed regularly twice a year under proper supervision.

J H T W

PEVERELLI (P) De cholera-epidemie in 1927 te Batavia. [The Batavia Cholera Epidemic of 1927]—*Nederl Tijdschr v Geneesk* 1928 Nov 10 72nd Year 2nd Half No 45 pp 5579-5584

Since 1919 the Dutch East Indies had been free from cholera. The small epidemic in question was preceded by an outbreak on board a steamer coming from Singapore. Before the disease on this ship was recognized there had been contact of the ship with the shore. After a fortnight (3rd Nov) another case occurred in the seaport Tandjong Priok. Adequate measures (disinfection isolation of contacts and vaccination) were immediately taken. Yet after another 12 days another four fatal cases occurred in a densely populated Chinese quarter of Batavia. Thereafter till 21st December another four cases came under observation all ending fatally. The obligatory *post mortem* inspection makes it practically impossible that any other fatal cases have escaped attention.

No connexion between the separate cases could be found, except in two cases probably due to food infection in a boarding house. The cases remarkably did not occur in the most unhygienic parts of the town and the author ascribes the spread to carriers a few of which were detected especially among the prostitutes of the seaport who no doubt had been in contact with the crew of the infected steamer.

The epidemic quickly subsided after the usual measures early detection of cases isolation disinfection notification quarantine and extensive vaccination. 235 611 people or about 62 per cent of the total population were vaccinated before the end of November.

W J Bais.

- i DE VOGEL (W) Le choléra à Batavia (Indes Néerlandaises) en octobre 1927 et les mesures qui ont amené sa disparition [Cholera in Batavia]—*Bull Office Internat d'Hyg Publique* 1928 Aug Vol 20 No 8 pp 1232-1241 With 2 figs & 2 maps
- ii WINCKEL (Ch) Instructions pratiques pour vacciner un grand nombre de personnes en peu de temps afin d'immuniser la population contre une épidémie de choléra menaçante—*Ibid* pp 1242-1245 With 1 fig

- 1 An ordinary report of an outbreak of cholera—contains nothing new
- 2 Complete instructions for rapid vaccination with anti-cholera vaccine with proper sterilization of instruments etc. The method does not differ from the practice in other countries

J H T W

TULL (J C.) Cholera Carriers in the S.S. Hawaii Maru.—*Malayan Med Jl* 1928. Sept Vol. 3 No 3 pp 106-107

The S.S. *Hawaii Maru* arrived in Singapore early in April. Passengers mostly Japanese were allowed to go on shore at Saigon where

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J. H. T. W.

AUDIBERT L'épidémie de choléra en Indochine en 1926-1927 (Cholera in Indo-China.)—*Bull. Office Internat. d'Hyg. Publique* 1928. Mar. Vol. 20 No. 5 pp. 662-701.

The author describes the various outbreaks of cholera in the provinces of Indo-China. The mortality was not very great and vaccination was carefully carried out. During 1926, 2,172,784 inoculations

DHAR (D. R.) & SEN (K. C.) On the Theoretical Basis of the Kaolin Treatment of Cholera and other Bacillary Infections of the Intestines.—*Calcutta Med J* 1928 Aug Vol 23 No 2 pp 67-72 With 1 chart in text [5 refs.]

The use of kaolin for the treatment of diarrhoea and cholera is generally well known. It is also used as a prophylactic by putting it into drinking water. It is a form of aluminosilicate and it is evident that there cannot be any appreciable change in the kaolin as it passes through the alimentary canal and it has no direct germicidal action. Some investigators consider its action to be mechanical but the author states that this cannot explain all the facts. It is to be assumed that the bacteria are kept attached to the surface of the kaolin and that the amount of adsorption is very high. The question whether living bacteria can multiply in presence of kaolin in a suitable culture medium will be dealt with in another paper. The present paper gives results of experiments with dead *V. cholerae* colon and typhoid bacilli. Three tables are given showing the percentage of adsorption and it is observed that the cholera vibrios are adsorbed much more than colon or typhoid bacilli. 60 per cent to 90 per cent. 30 per cent to 60 per cent and 16 per cent to 20 per cent.

J. H. T. W.

MATSUMOTO (Kaoru) ANDO (Keisaburo) & SHIRAIWA (Tatsujiro) Zur Frage der Durchlässigkeit der intakten Haut für Typhus Paratyphus- und Cholerabazillen [*Passage of the Intact Skin by Typhoid, Paratyphoid and Cholera Bacilli.*]—*Scientific Reports Govt Inst Infect Dis* Tokyo 1927 Vol. 6 pp 35-48 [16 refs.]

The experiments were carried out upon guineapigs with suspensions of the test organisms which were applied to shaved or unshaved skin over a surface of 2 cm diameter. In some cases the skin was cleaned with alcohol before the application. Half an hour to five hours later the skin was disinfected with ether iodine and alcohol and the animal set free from its constraint. The animals were killed 15 to 27 hours after and portions of the tissues or organs taken for culture of the organisms used. It was manifest that infection of internal organs had taken place but to a far greater extent and with greater frequency where the skin had been shaved than where it had not been shaved. Shaving produces minute open fresh wounds. Control experiments made with avirulent or with saprophytic organisms showed that these also could pass through the shaved skin to internal organs.

W. F. Harvey

VAN RIEMSDIJK (M.) De invloed van de zuurstof op de bewegelijkheid der cholera vibronen. De langdurige hangende-druppel. [*Oxygen and the Motility of Cholera Vibrios. The Permanent Hanging-Drop*]—*Nederl Tijdschr v Hyg Microbiol en Serol* 1928. Vol. 3 No 1 pp 1-21 With 2 text figs [3 refs.] [M van Riemsdijk Bact & Serol Lab Amsterdam.]

If the vibrios from the pellicle of a bouillon culture of the cholera vibrios and from the fluid beneath the pellicle be examined in hanging drop over a period of twenty days certain remarkable phenomena are

observed. In the first place the vibrios from the pellicle show high motility as contrasted with those taken from beneath the pellicle whose motility is low and scarcely to be distinguished from Brownian movement. The phenomena noted in this paper are especially to be seen in the more sensitive "under-pellicle" vibrios. Autoagglutination of the weakly moving organisms first takes place. In 3 or 4 days time active motility is developed and the autoagglutination begins to diminish, but ultimately motility is again lost autoagglutination sets in and there is production of involution forms. The causes of pellicle formation, autoagglutination and involution form production are severally considered from the standpoint of physical chemistry. High motility and low motility of vibrios is ascribed to the presence and absence of oxygen respectively.

W F Harvey

SORU (Eugène). Le signe de la charge électrique de vibron cholérique normal, de l'agglutinine correspondante et du vibron sensibilisé. [The Electric Charge of Normal and Sensitized Cholera Vibrios and of their Agglutinin].—*C R Soc. Biol.* 1928. July 6. Vol. 99 No. 23. pp 430-432. [7 refs.] Lab of Experim. Med. & Serolog Inst., Bucharest.]

As a suspension fluid isotonic saccharose solution was used. The results obtained were —

1. Normal cholera vibrios have a negative charge and they show no change of sign in solutions with pH between 1.9 and 10.5. The speed of translation however was diminished between pH 1.19 and 2.7.

2. Sensitized cholera vibrios have a negative charge between pH 4.5 and 10.5 show an isoelectric zone between pH 3.6 and 4.5 and have a positive charge below pH 3.6.

3. (a) The isoelectric point of an agglutinating serum with titre 1-15 000 was in the neighbourhood of pH 5.6 of one with titre 1-28 000 in the neighbourhood of pH 6.8.

(b) Cholera agglutinin, freed from the proteins of the serum, has a constant isoelectric point in the neighbourhood of pH 4.

The conclusions are drawn that —(1) Since agglutination still takes place at a pH at which both cholera vibrios and specific agglutinin have negative charges, it cannot be ascribed to difference in the sign of the charges. (2) Since sensitized vibrios show difference in the sign of their charge from normal vibrios in the neighbourhood of pH 3.6 and have an isoelectric zone corresponding in part to that of purified agglutinin, we may infer that specific agglutination is due to a modification of surface tension, resulting in adsorption of agglutinin at the surface of the organism according to the law of GIBBS.

W F Harvey

UKIL (A. C.) The Action of Cholera Convalescent Serum on Common Vibrios.—*Calcutta Med J* 1928. July Vol. 23 No. 1 pp. 1-4. [1 ref.]

Professor Ukil's work was based upon reports by Dr P. N. Das and Dr S. C. Basu concerning the marked reduction in mortality of cholera cases treated with convalescent serum. The author collected sera from over 40 cholera convalescents in the cholera ward of the Chittaranjan Hospital, Calcutta, and 30 of these form the subject

matter of this study. All the cases were bacteriologically diagnosed as being due to agglutinating Koch's vibrios. Macroscopic agglutination 10 sera 1/1 000 9 1/500 6 1/100 and 5 which did not produce agglutination of vibrios. As regards bacteriolysis *in vitro* 18 sera gave complete dissolution (no growth of vibrios on plates) 7 gave partial dissolution and 5 very weak dissolution (large number of colonies on plates). For *in vivo* experiments lethal doses of vibrios were mixed with different dilutions of serum and injected into rabbits. The results not very satisfactory are given in a table

J H T W

GARCIA (Onofre) Notes on the Serological Relationship of the Cholera-like Vibrios isolated from Human Beings and from Waters in Manila.—*Philippine Jl Sci* 1928 June Vol 36 No 2. pp 187-198 [2 refs.]

Three cholera like vibrios were isolated from human cases all of them haemolytic and identical in cultural and sugar reactions with true cholera vibrios. Sero logically the three vibrios belonged to different groups. Sera were prepared from them and were used to determine the position of 250 strains of cholera like vibrios isolated from shellfish sewage drinking water and sea water. Only 5 of these all water vibrios gave agglutination reactions to the sera when tested in dilution of 1 in 1 600. Four agglutinated with one serum one with the second and none with the third. A true cholera serum was also used in test, but neither the human cholera like organisms nor the water cholera like organisms were agglutinated by it. Absorption tests confirmed the simple agglutination tests and established the identity of the tested cholera like water organisms with the cholera like organisms isolated from human beings. Cholera like vibrios were frequently found in stools of healthy persons in the beginning or toward the end of outbreaks of cholera. Furthermore non-agglutinable cholera like vibrios may be found simultaneously or alternatively with agglutinable cholera vibrios in cholera patients and convalescents.

W F Harvey

VICKERS (W J) Cholera Control in Rural Areas with Particular Reference to Rubber Estates.—*Malayan Med Jl* 1928 June. Vol 3 No 2. pp 78-83 [14 refs.]

As regards general protection and sanitation on rubber estates this paper adds very little to the regulations laid down by Malcolm WARSON (this *Bulletin* Vol. 25 p 307) but the author enters more fully into the use of prophylactic vaccination quoting figures for bilivaccine and anti-cholera vaccine from work done in India [this *Bulletin* Vol. 25 p 312 (LEAGUE OF NATIONS)]

J H T W

GRAHAM (J D) Recherches sur le choléra et la vaccination anti-cholérique dans l'Inde Britannique [Cholera and Anti Cholera Vaccination in British India].—*Bull Office Internat d'Hyg Publique* 1928 May Vol 20 No 5 pp 702-709 [12 refs.]

This report refers to anti-cholera vaccine work done during 1927 in Bengal and Madras. Oral bile-vaccine and ordinary vaccine by

inoculation are compared. The results are in favour of subcutaneous inoculation. [See this *Bulletin* Vol. 24 p. 923 (GRAHAM)]

J H T W

ZDRODOWSKI (P) Recherches expérimentales sur la pathogénie du choléra. [Experiments on the Pathogeny of Cholera.]—*Ann. Inst. Pasteur* 1928 Oct. Vol. 42 No. 10 pp 1242-1258 [3 refs.]

These laboratory experiments on rabbits were undertaken to confirm and verify the similar work done by SANARELLI. SANARELLI'S Cholera Memoirs are well known and have received notice in this *Bulletin*—see Vol. 21 p. 447 also Vol. 22, p. 769 (ZDRODOWSKI & BRENN)

J H T W

GRAHAM (J. D.) Travail sur le bactériophage du choléra aux Indes. [Work on the Bacteriophage of Cholera in India.]—*Bull. Office Internat. d'Hyg. Publique* 1928 Aug. Vol. 20 No. 8 pp 116-1231

This is an official report on work already noticed in this *Bulletin*—see Vol. 25 p. 308 (D'HERELLE & MALONE) also p. 677 (ROX, BAGCHI & ROY)

J H T W

DOUCET (M. L. F.) CAUVERT (P. J. J.) & ESCALIER (J. A. E.) La défense des territoires du Levant, placés sous mandat français, contre l'épidémie de choléra ayant sévi en Irak (juillet-décembre 1927). Exposé chronologique des faits et des mesures prises.—*Arch. M. d. et Pharm. Mulu* 1928. Aug. Vol. 88 No. 2 pp 129-169 With 1 folding map

PLAGUE

ALLAN (W) *Annual Report on Plague in Nigeria, 1927*—*Ann Med & San Rep Nigeria 1927* Appendix E pp 91-105 With 3 folding maps.

Compared with 1926 there was a marked diminution in the number of cases both in Lagos and on the mainland but as the incidence was low all over the world during 1927 it is impossible to interpret exactly to what the diminution is due and if it is likely to be permanent. The figures for Lagos were 155 cases with 151 deaths 4 cases of bubonic plague out of 45 recovered the other deaths were cases of septicaemic and pneumonic plague. On the mainland 242 cases were reported with 190 deaths. In the septicaemic type the primary bubo was usually large and necrotic and the bacilli were more scanty than in the purely bubonic type. Examination of rats for evidence of infection was continued under the Director of Medical Research at Ereko Dispensary. Of 57 087 rats examined 675 showed positive results. Inquiries as to flea infestation of rats and of houses were carried out. Rodent destruction was carried out by deratting gangs and the importance of concrete floors for houses urged. Passengers by ship canoe and road were inspected and third class passengers by ocean steamers were disinfected with their baggage before leaving Lagos. 15 141 persons were inoculated during the year and inoculation of contacts was carried out as far as possible during the Ogere and Ifo epidemics.

J H Tull Walsh.

OTERO (P Morales) *Epidemiologic Survey of the Epidemic of Bubonic Plague in Porto Rico in the Year 1921.*—*Porto Rico Rev of Public Health & Trop Med 1927* Aug Vol 3 No 2. pp. 51-58 With 2 charts & 1 map

Of the 93 infected rats captured during the epidemic, nine belonged to *M. alexandrinus* 21 to *M. rattus* and 63 to *M. decumanus*. The pathological conditions were those commonly found in rat plague but it was also noted at the beginning of the outbreak that some rats found dead did not show any microscopic lesion other than marked emaciation and intense anaemia. Inoculation into guineapigs showed that these rats contained virulent organisms of plague. 93 guineapigs were inoculated, one for each positive rat but only 76 died. The 17 that resisted were killed after 21 days. *B. pestis* was detected in smears and by cultures. The presence of bipolar organisms should always be checked by experimental inoculation.

J H T W

NAESLUND (Carl) & STRÖMAN (Ragnar) *The Plague in Sweden in 1927*—*Uppsala Läkartidskrift Förhandl 1928* June 16 NS Vol 34 Nos 1-2. pp 289-297 [6 refs] [Fejan Quarantine & State Bact Inst.]

Up to a certain point this is practically the same story as that already noticed in this *Bulletin* Vol. 25 p 671 (KLING). The author states that during the discharge of cargo at Gävle (Gefle) not a single rat dead or alive was observed. The pure cultures obtained were both derived from case No 3 (U) in which plague bacilli could not be

discovered on the first bacteriological examination of bubonic material taken at Gelle. The first cultivation of plague bacteria was achieved 52 days after the patient had fallen ill, the second 68 days after. This shows that plague bacilli may occur in bubonic glands more than two months after the onset of the illness and that one or more bacteriological examinations with negative results do not suffice to determine the existence of bubonic plague. The author says it is difficult to fix the source of infection. No dead rats were noticed on the voyage, and when the vessel was fumigated (before being released to discharge cargo) the score of rats found did not show any macroscopic signs of plague. Unfortunately the corpses were not examined bacteriologically and apparently healthy rats may be carriers of plague bacilli. A plague bubo which was somewhat larger than a hen's egg took nearly five months to heal. Repeated treatment with serum in large doses appeared to have a very favourable effect on the process of healing both in plague sepsis and in bubonic plague.

J. H. T. W.

Comptes Rendus du Premier Congrès Antipesteux de l'U.R.S.S. Saratov du 31 mai au 3 juin 1927. Report of the First Plague Congress of Soviet Russia. —500 pp. With numerous illustrations. 1928. Saratov.

This Report gives a good idea of the activities of the plague workers in South-East Russia. Much of their work follows the lines indicated in previous publications and adds to our knowledge of the local conditions that help to perpetuate the evil work of plague in this region.

Within the period from October 9-5 May 1927 there were in South-East Russia 42 plague epidemics with 310 cases of which 294 proved fatal. The infection in 11 of the epidemics originated from domestic and field mice 4 were from spermophiles 3 from jerboas (*Dipodops sagitta*) 4 from gerbils (*Rhombomys opimus*) 4 outbreaks were associated with the sojourn of persons on the steppes and were perhaps caused by the fleas of the steppe-rodents and 7 outbreaks were traced to infection contracted at the slaughter of plague-infected camels.

In December 1926 a Russian Mission investigated an outbreak with 23 deaths at Tchoukouray in Mongolia. The first was a bubonic case which had been infected from a diseased tarbagan the remaining cases were of the pneumonic variety and were infected one from another. The epizootic mortality—presumably from plague—in the tarbagans in this region occurs in summer and autumn they are hunted remorselessly because their fur has a particular shade of colour which is specially prized.

GOLLOV and LOFF give an account of the species of fleas that infest the various steppe-rodents. They conclude that fleas capable of biting man are found on nearly every rodent which plays an active part in the spread of plague in Russia, and that the transmission of plague to man during the epizootics is probably brought about by fleas. They devoted particular attention to the fleas (*Oropsylla nianitensis*) of the marmot (*Marmota bobac*) *Ceratophyllus leucogaster* and *Ceratophyllus arvensis* the fleas of the spermophile and *Ceratophyllus mollis* and *C. consimilis*, the fleas of the house-mouse. They were able to transfer plague experimentally by means of these flea species to nearly every kind of rodent which is responsible for spreading

plague in South East Russia. They obtained 40 positive transmissions which resulted in 21 septicæmic cases and 19 bubonic cases among the animals thus infected in the 19 bubonic cases there were 15 axillary buboes a preponderance which is also met with in the spontaneous epizootics. GOLOV and IOFF observed proventricular blocking in *C. tesquorum* and in *C. laeviceps* the gerbille flea they also noted regurgitation of plague bacilli in *C. tesquorum* and they are convinced that *Neopsylla setosa* and *C. consimilis* can transmit plague in the act of biting. They often observed that rodents devour infected fleas and imagine therefore that the infection may sometimes penetrate by this means through the mucous membrane of the mouth.

IOFF has made a collection of fleas taken from man domestic animals rodents and other mammals both carnivorous and insectivorous. He has found 48 species of fleas, belonging to 22 genera some of them hitherto undescribed. *X. cheopis* has been discovered in the little fishing villages near Astrakhan on the Caspian Sea that is near a port of a closed sea. Among 9700 fleas examined there were 16 instances of rodent fleas having been captured in human habitations either in the beds or on the bodies of the occupants. The Report does not state whether these observations were made during the epidemic or the non-epidemic season.

GOLOV and IOFF have proved by experiment that plague bacilli do not survive in the developmental stages of the fleas that infest the steppe-rodents a result which confirms the work of BACOT on this subject. They confirmed too the results of the Indian Plague Research Commission who showed that the longevity of infected fleas whether kept fed or without food varies inversely with the temperature at which they are stored. The Russian observers found that starved fleas when kept at 37° C lived for only 5 days whereas at 0-15° C they lived for 396 days. They succeeded in transmitting plague by fleas which were maintained without food at the temperature of the cellar during a period of 150 days.

NIKANOROV and GAIISKY conclude that the rodent fleas can without doubt transmit the infection during the epizootic and the epidemic season, but that they are unlikely to act as carriers of the infection over prolonged periods. They believe that apart from the epizootics both man and the rodent may carry plague bacilli [a conclusion which is opposed by evidence from other sources].

The infectivity of fleas in spermophile burrows was tested in a region in which destructive measures with CS₂ and Cl₂ had been organized. In spite of this treatment the fleas remained alive during the winter in the nests situated in the burrows. The fleas proved to be non infective and the conclusion is drawn that they probably do not act as carriers of the plague bacillus from one season to another [On the ground that owing to the death of the hosts the conditions in which the observations were made were unnatural the present writer does not feel convinced of the validity of this conclusion].

An epizootic in field mice (*Lagurus lagurus*) appeared for the first time in 1927 in South East Russia. The fleas collected in the deserted nests were shown by guinea pig tests to be infected.

In this Report there will be found three notes on the biology of the steppe-rodents with special reference to the spermophile (*Citellus musicus* Ménét) and the jerboa (*Dipodops sagitta*). Such matters as their habits of life hibernation food supply and the nature of their burrows are discussed.

An account is given of the measures for spermophile destruction that have been carried out in South-East Russia by means of CS_2 and Cl_2 . Nearly $6\frac{1}{2}$ million spermophiles were destroyed over an area of 212 square miles (51 000 hectares) in localities where epizootics were known to exist. Chemical fumigation as a preventive measure after an epizootic has broken out is not recommended.

A summary of the work of GRIAROV on the chemical fractionation of the plague bacillus is so condensed that the various steps are difficult to follow. He found that a lipoid fraction constitutes nearly 7 per cent. of the total weight of the dried bacilli. A note by GOUBAREV on the autolysis (proteolysis) of the plague bacillus also suffers from undue condensation.

There are three papers on the differential diagnosis between *Past. pestis* and *B. pseudotuberculosis rodentium*. In the first it is stated that the value of the glycerine medium of Colas-Belcour has not been confirmed because all the strains examined turned the medium acid. In the second paper NIKANOROV describes how it is possible in most cases to distinguish between the two organisms by taking advantage of the circumstance that the pseudotubercle bacillus produces relatively more alkali during its growth than the plague bacillus—the difference is readily made apparent by using a culture medium with a suitable indicator. Thus the pseudotubercle bacillus changes a thymol-blue medium to a dirty-green colour whereas the plague bacillus produces no change after 3 to 5 days growth. The author admits, however, that owing to the existence of extreme varieties of both the plague bacillus and the pseudotubercle bacillus the test is not an absolutely differential one. ZLATOGOROV and MOGILEVSKAYA in a third paper on the subject state their belief that maltose and glycerine media are not truly differential, and that the whole question remains an open one. By plating out 3 strains of the pseudotubercle bacillus from broth cultures every 7 days they obtained about the third week variants with antigenic properties that were different from those of the original cultures. [None of the Russian authors appears to be aware of the motility test for distinguishing the plague bacillus from the pseudotubercle bacillus. The motility of the latter organism is specially apparent in cultures grown at room temperature—an old observation rediscovered a short time ago by ARKWRIGHT.]

The Report contains three articles on experimental plague in the guinea-pig, and one on the results of feeding spermophiles with plague bacilli. A purely intestinal form of plague was not observed, and since plague bacilli were not very often found in the intestinal contents of the experimental animals it is considered that the excreta of plague animals do not favour the spread of the disease to any important extent—a conclusion which supports work that is already firmly established.

Lastly a description is given of a mysterious outbreak in man characterized by glandular swellings, 75 per cent. of which were inguinal or femoral. There were 160 cases in the summer of 1926 in the region of the lower basin of the Volga. The disease was not plague. It was feebly contagious; children were chiefly affected and there were no deaths. A description is extant of a similar disease in the summer of 1877 in the same region—there were 200 cases and all recovered. The recent outbreak was associated with a small coccobacillus, which it is thought may be *Bact. tularensis*. The large number of cases is a point against the diagnosis of tularaemia. The

disease is supposed to have had some connexion with an inundation which was followed by an exceptional migration of water rats into the houses

G F Petrie

OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE Les faunes régionales des rongeurs et des puces dans leurs rapports avec la peste Résultats de l'enquête du comité permanent de l'office international d'hygiène publique 1924-1927 [The Geographical Distribution of Rodents and Fleas in relation to Plague] [Rapporteur JORGE (Ricardo)] Etude systématique descriptive des puces des rongeurs transmettant la peste [ROUBAUD (E.)]—306 pp With 10 plates 7 figs 2 maps & 4 diagrams. 1928 Paris Masson et Cie Editeurs 120 Boulevard St Germain

This useful work assembles in a concise and easily accessible form numerous observations on plague-carrying rodents and their fleas. The data have been arranged as separate reports contributed by authorities in the various countries that have suffered from plague during the present pandemic or that are open to the risk of attack. Most of the countries of Europe are represented and there is an admirable review of British observations but curiously no account has been furnished of plague experience in France within recent years: this is unfortunate because the present reviewer at least has not yet succeeded in discovering an authoritative analysis of the limited outbreak that occurred in Paris a few years ago. The account of plague in Java seems to be unduly brief—a report compiled by one of the well known plague workers in Java would have been welcome. NIKANOROV gives an excellent compendium of recent plague work in Russia and the large-scale observations on the distribution of rat flea species in the United Provinces in India are adequately presented by GRAHAM and by MITAL. Professor Ricardo JORGE, Director-General of Public Health in Portugal, has written an introductory article which summarizes the detailed reports that follow and by his fresh and allusive style has contrived to give an entertaining account of the subject.

The Report as a whole is too full of detail for abstraction in strict geographical order: the following notes are therefore brought together without reference to their exact sequence in the volume.

For the two important plague-bearing rats the genus *Epimys* (Trouessart 1881) is generally adopted but in England the name *Rattus* (Fitzing 1867) is preferred. The specific name *decumanus* given to the brown rat by PALLAS in 1778 has been replaced by *norvegicus* the name given by ERXLEBEN in 1777. This name suggests that the brown rat is a native of Norway but actually it reached that country last in its migration through Europe. A black variety of *R. norvegicus* was first noted in Ireland in 1837 and was named *Mus hibernicus*: it is becoming more widespread. HINTON refers to 3 sub-species of the black rat: (1) *Rattus rattus rattus* (the type species—a European variety) (2) *Rattus rattus alexandrinus* (Asia Minor and North Africa) and (3) *Rattus rattus frugivorus* (the roof or tree rat—a Mediterranean variety). The second and third of these sub-species are found in colonies that inhabit roof kitchens and restaurants in various parts of London. JORGE remarks that there are black rats that are brown, and brown rats that are black and grey rats in both

groups he therefore suggests that a chromatic dichotomy has no value for purposes of differentiation or classification.

R. rattus disappeared from England and other European countries only after the middle of the last century and therefore the immunity of Europe from plague cannot be explained by the change in the rat fauna, but is to be traced rather to the progress of civilization with its higher standards of individual and public health.

R. rattus is the commonest species of rat in Palestine and Ceylon. In Uganda it is the prevalent species, and indeed *R. norvegicus* is unknown there. In 1908 *R. rattus* was not found in Accra, whereas to-day it is much more numerous than *R. norvegicus*, which was then the most commonly found species. *R. rattus* is apparently almost the only species captured on ships at Amsterdam.

R. norvegicus forms 70 per cent of the rat population in Iraq 80 per cent. in Mauritius and it is the predominant species in the Straits Settlements and in Hong Kong.

HIXTON has drawn attention to the risk of the introduction and spread of plague among the grey American squirrels (*Sciurus carolinensis*) which are now becoming distributed over the whole of Great Britain but there is no mention of experiments on the susceptibility to plague of this species.

Spermophiles are the chief transmitting agents of plague in the steppe-region of South-East Russia, just as mice are the important carriers in the sandy region of the South. There is a regular coincidence between epizootics among mice, human epidemics, and good crops of *Agropyllum "orenorium"* (Kowmaritchik) a plant which provides food, shelter and nesting material for the mice. There is a relation, too, between plague outbreaks and the time of cropping *Kiak* (*Elymus sabulosus*) a shrub whose long and numerous roots consolidate the soil, and so create favourable conditions for sheltering the nests of mice. It is singular that, notwithstanding their abundance, house and field mice in the steppe-region South-east Russia do not contract plague. JORGE comments upon the surprising circumstance that, contrary to experience in other countries, the domestic mouse in South Russia acts as a plague carrier.

The problem of the relative importance of *X. cheopis* and *X. astia* has not yet been solved. Both GRAHAM and MITAL consider that the results of the work done so far in India do not permit firm conclusions to be drawn, partly because there are inexplicable variations, both local and seasonal, in the distribution of these flea species. MITAL and his colleagues have examined one-third of a million fleas taken from rats captured in various localities in the United Provinces. Of the total number 54 per cent were *X. astia*, 42 per cent. *X. cheopis* and 3.5 per cent. *Ceratophyllus*. MITAL states that the coefficient of correlation between the percentage figures for *X. cheopis* and the yearly plague rates is negligible. In 1923 there was a high mortality from plague in Banda Town at a time when the *cheopis* ratio was low.

X. cheopis is the predominant rat flea in Singapore and Penang, and thus the freedom of the Malay States from plague is not attributable to the substitution of *X. astia* for *X. cheopis* but is to be ascribed rather to climatic conditions and especially to the high temperatures prevalent there.

X. astia was found in May 1922, on *R. norvegicus* and *Cricetomys gambianus* in the Gold Coast previously it had not been found in Africa.

X. brasiliensis is apparently not commonly found in India Africa is its ancestral home but it has spread to South America hence its name It is the predominant species in Uganda Kenya and Nigeria and it seems to be capable of transmitting plague from rat to rat and from rat to man For example in Kabete it was almost the only species of flea found on *R. rattus* in huts in the infected districts Plague in Kenya has never been as destructive as might be expected from a consideration of the climate the conditions in the native houses and the very large rat population

Neither *X. astia* nor *X. brasiliensis* has been found in the United States of America. During 1926 the laboratory of the quarantine station of New York examined 6 274 fleas from 12,808 rats obtained from 635 ships after fumigation with HCN The results were as follows —

<i>X. cheopis</i>	5 521	<i>L. muscui</i>	54
<i>X. astia</i>	27	<i>Ctenocephalus canis or felis</i>	9
<i>X. brasiliensis</i>	4	<i>P. irritans</i>	1
<i>C. fuscatus</i>	653	Not identified	5
Total			6 274

Of 480 fleas taken from rats captured in Bombay City during September October November (? 1925) there were 276 *X. cheopis* 150 *X. astia* and 54 *X. brasiliensis*

In the report from the United States an index of risk from plague or otherwise phrased an index of epidemicity is formulated with due reservations. When the yearly mean of fleas per rat is less than 5 and when the predominating flea is other than *X. cheopis* there is probably no danger of a serious outbreak of plague but when the figure is over 5 and the prevalent flea is *X. cheopis* bubonic plague may appear and if it does the incidence will be directly proportional to the average number of fleas per rat In his introductory statement JORGE expresses doubt as to the value of this measurement and it certainly seems that in oriental countries at least the factors that govern the severity of plague epidemics are too numerous and complicated to permit of their inclusion within the limits of a simple formula such as this

The Report contains a paper by Lt.-Colonel W H C FORSTER on the forecasting of plague epidemics in the Punjab His analysis of the statistical data of plague in this Province for the past 26 years shows that a depression of the seasonal curve in December is correlated with a mild outbreak in the following spring The diminished mortality is probably associated with a lack of rain in the month of November which exerts a harmful influence upon the life-cycle of the rat flea.

The Report as a whole gives ample evidence of a general belief in the outstanding importance of the rat flea in the spread of human plague The author of the report from Italy seems to regard the fact that plague may occur in rats without a corresponding human outbreak as a point against the view that the rat flea plays a dominant rôle in the transmission of plague to man he cites the experience at the Port of Genoa as an example. This argument has been dealt with by SWELLENGREBEL in one of his papers but it may be pointed out here that the question is one of chance and of the proximity and length of exposure of man to the infected rat flea, and that in European conditions the chances must often favour the escape of the person at risk. No one with experience of conditions as they exist in the East can doubt that the chances

of infection are considerably greater than they are likely to be in civilized countries.

The volume ends with a chapter compiled by ROUBAUD which gives a systematic description, with illustrations, of the chief types of rodent flea.

G F Petrie.

LEIARTE (Leopoldo) Breves antecedentes para el estudio de la peste bubónica. [Notes for Study of Bubonic Plague.]—*Rev. Inst. Bacteriol.* 1927 July Vol. 4 No 8 pp 765-772. With map on p. 774 [English summary pp. 772-773.]

Since plague first appeared in the Argentine experience has proved that the rat is the normal reservoir of the virus and that it preserves and spreads it. The predominant species is *M. decumanus* followed by *M. rattus* and *M. alexandrinus*. Sometimes bags of grain have contributed to the spread of the disease. The species of flea most commonly found is *X. cheopis*. Natural plague has been proved twice in the *Caria aperca* [this *Bulletin* Vol. 22, p. 377.] There is no bacteriological proof that other wild rodents are affected.

J H T W

GOYLE (A. N.). Comparative Experiments on the Transmission of Plague by Fleas of the Genus *Xenopsylla* (*Cheopis* and *Astia*) with a Discussion on the Flea-Species Distribution in its Relation to the Incidence of Plague.—*Indian J. Med. Res.* 1928. Apr. Vol. 15 No. 4. pp. 837-860. With 1 chart. 23 refs. [Provincial Hygiene Inst., Lucknow India.]

A further contribution to the comparative experiments on plague transmission among rats by *X. cheopis* and *X. astia*. These have yielded similar results to those previously recorded. Males of *cheopis* and *astia* carry infection more readily than the females and the males have a shorter duration of life than the females. *X. cheopis* lives longer than *X. astia* [see this *Bulletin* Vol. 24 p. 930 (Hirst) 932 (GOYLE)].

J H T W

WU LIEN TEH. [Hibernation Experiments in Plague.]—*Jl. Oriental Med.* 1928. Aug. Vol. 9 No. 2. [In Japanese English summary pp. 17-20.] [Manchurian Plague Prevention Service, Harbin.]

The author states that the problem of plague in hibernating rodents is of practical as well as of theoretical interest. Certain species subject to prolonged hibernation are known to be the source of human infection during the warm season of the year. Are these rodents true carriers of plague throughout the year or do they only suffer from plague while awake? GARSKI (1915-1926) found that of 30 susliks of S. Russia infected while hibernating 21 died more or less quickly. The work of GOLOV and LOFF is also mentioned [see this *Bulletin* Vol. 24 p. 937]. DUJARDIN BEAUMETZ and MORRY found that while a non-hibernating Alpine marmot died quickly after infection two others which slept survived for 61 and 115 days respectively. They showed foci of chronic pneumonia and the bodies contained plague bacilli, but there were no buboes. The

author's experiments with hibernating Siberian marmots show that infected with plague they may continue to sleep and succumb considerably later than those infected while awake

J H T W

FOXQUERNIE (J) Note au sujet du traitement de la peste pulmonaire. [Treatment of Pneumonic Plague.]—*Bull Soc Path Exot* 1928. July 11 Vol 21 No 7 pp 600-601

Between June 9 and December 31 1927 seventeen cases of pulmonary plague occurred. They all died. They are said to have received anti plague vaccine 2-4 days before the outbreak and in one case serum was employed for treatment. Other forms of treatment included cardiac tonics and camphor oil fixation abscess intravenous injections of electrargol or collargol 20 per cent. and intravenous injections of iodine (neoiodine or strong solution of Lugol)

J H T W

DE SMIDT (F P G) Bacteriology of Nairobi Plague Prophylactic.—*Kenya & East African Med Jl* 1928 June Vol 5 No 3 pp 77-92. [12 refs.]

The clear top fluid of the Haffkine plague prophylactic vaccine as prepared at Nairobi contains 40 to 50 mgm dissolved protein in 100 cc. Immunizing potency is almost wholly restricted to this top fluid and its dissolved protein constituents give rise to the severe local and general reactions of plague vaccine. It would be very desirable to have a vaccine of equal immunizing power but with less disturbing reaction. An auto-digest of pancreas is used as culture medium. The minced pancreas in water is incubated at 37° C filtered and the filtrate sterilized. A 20 per cent strength of this filtrate with 1 per cent peptone and 0.5 per cent. sod. chloride forms the medium for growth of *Past pestis* (bacillus pestis). Incubation is carried on first at 30° C and then at room temperature with shaking of cultures at intervals of 3 days. The cultures are sterilized by 1 per cent phenol at the end of 12 weeks and this vaccine is kept for at least 5 weeks before issue to reduce as far as possible its toxicity. In a good average sample of broth vaccine there is found 0.45 to 0.55 mgm sediment per cc. and 40 to 50 mgm dissolved protein per cc. Standardization is based on these values and a satisfactory vaccine should contain 0.85 to 1 mgm. per cc. of bacterial solids in suspension and solution. Experimental work on a limited number of rats has shown the efficacy of the standard vaccine and also the inefficiency of a weak vaccine such as is represented by one containing only 0.53 mgm suspended and dissolved solids per cc.

W F Harvey

ZLATOGOROFF (S J) & MOGHILEVSKAIA (B) Composition des cultures du bacille de la pseudotuberculose des rongeurs et parenté de ce bacille avec le bacille de la peste [Composition of Cultures of the Bacillus of Pseudotuberculosis of Rodents and its Relation to *Past pestis*].—*C R Soc Biol* 1928 July 13 Vol. 99 No 24 pp 506-507 [Bact. Inst Kharkov Ukraine]

Two strains of *Past pseudotuberculosis rodentium* were used and were sown from bouillon containing only a minute amount of peptone on to

nutrient agar plates. Smooth and wrinkled types of colony were obtained, corresponding respectively to the smooth (S) and rough (R) colonies of ARKWRIGHT. The smooth colony organisms were very virulent for guinea-pigs whilst the wrinkled colony organisms were comparatively avirulent. In their fermentation of carbohydrates the smooth colony organisms resembled *Past. pestis* whilst the wrinkled colony organisms gave the fermentations of *Past. pseudotuberculosis rodentium*. Thus the dissociation of cultures of the pseudotuberculosis organism shows that they contain elements differing in no respect or only in degree from plague cultures.

W F Harvey

LEESON (Frank) A Plague-like Septicaemia of the Wild Rat *Cricetomys gambianus*.—*West African Med J* Lagos. 1928. Oct Vol. 2 No. 2 pp 130-131 [4 refs.]

As a plague preventive measure examination is made of dead rats and other wild rodents for *Past. pestis* (*Bacillus pestis*). The author has observed in the course of this work a septicæmic condition along with pathological conditions which might easily be mistaken for plague infection. The organism isolated was not unlike the plague bacillus but was readily distinguished from it by cultural characters. It gave acid and gas in a large number of sugars, was indol-negative, gram-negative, and pathogenic for rats. [One would almost require to demonstrate the existence of this septicæmic condition, as a disease of living rats in nature, in addition to isolating the organism from dead rats.]

W F Harvey

RANGANATHAN (K. S.) An Epizootic in Squirrels at Kumbakonam.—*Indian Med Gaz.* 1928. Oct. Vol. 63 No 10 pp 578-579 [King Inst. Preventive Med. Guindy Madras.]

The occurrence of an epizootic of what looks like plague in squirrels without coincident disease in rats or men is recorded. Of smears from four squirrels found dead in two adjacent bungalows in Kumbakonam Extension between September 28 and October 6 1927 all showed bacilli morphologically indistinguishable from plague bacilli. Five more died between the 23rd and 25th September and two more on October 4th. All showed bacilli resembling *Past. pestis*. 113 rats were examined but showed no signs of plague. 114 captured squirrels were examined but no abnormal appearances were observed and no plague bacilli were found in smears from spleen and liver. All the squirrel fleas belonged to the species *Ceratophyllus argutus*. In the absence of cultural or animal inoculation tests one cannot be certain of the diagnosis.

J H T W

WU LIEN TEH. The Perpetuation of Plague among Wild Rodents.—*Amoy J Hyg* 1928 Sept. Vol. 8 No 5 pp 649-670 [21 refs.]

This is a general paper containing material for experiments on rodents during hibernation—see this *Bulletin* Vol. 24 pp 32-34 (GAINKY to SKORODUMOFF) p 456 (WU LIEN TEH)

J H T W

BOLETIN DE LA OFICINA SANITARIA PANAMERICANA 1928 Sept
Vol. 7 No 9 1055-1064 With 5 figs La antirratización
(Ratproofing) de los edificios como medida contra la peste. [Rat-
proofing of Buildings as an Anti Plague Measure.]

Rat-destruction is a purely temporary measure undertaken at the time when plague is present in a community but is futile, unless rat proofing of buildings is carried out in preventing future epidemics. This article gives in detail a Model Ordinance for rendering buildings rat proof. Minute details for building-construction are laid down stating that the foundations are to be of concrete of at least 7.5 cm thick, the floors also of concrete 15 cm. thick, and the same material is to be used up to a height of 60 cm above the level of the ground. If the building is raised on piles these are also to be of concrete. Inspectors are to be appointed to see that these and other regulations are duly fulfilled. The article is well illustrated with photographs showing buildings on the ground and on piles constructed mainly of wood which were heavily infested by rats and also some of the buildings under construction with the new materials and erected in accordance with the measures laid down in the ordinance

H. Harold Scott

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- ADVIER (M.) Considérations sur le traitement de la peste en Emyrne — *Bull Soc Path Exot* 1928 July 11 Vol. 21 No 7 pp 598-600 [1 ref.]
- GAMBIER (A.) La peste au Cambodge — *Bull Soc Path Exot* 1928 July 11 Vol. 21 No 7 pp 497-503 With 1 text fig
- LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT 1928 June 15 Vol. 7 No 6 pp 232-233 The Epidemic of Plague at Aden
- UNITED STATES NAVAL MEDICAL BULLETIN 1928 July Vol. 26 No 3 pp 776-777 — An Epidemic of Plague in Aden Arabia.
- URIARTE (Leopoldo) Sobre profilaxis de la peste bubónica. — *Rev Inst Bacteriológ* Buenos Aires. 1927 Nov Vol. 5 No 1 pp 5-16 English summary pp 17-18
- ZEISS (H.) Pest im Südosten (Nachtrag) und im fernen Osten. IV. Die Pest in Russland. — *Muench Med. Woch* 1928 Feb 10 Vol. 75 No 6. pp 271-273 [4 refs.]

TROPICAL DERMATOLOGY

MENDELSON (R. W.) Some Interesting Skin Diseases observed in Natives of the Tropics.—*Southwestern Med* 1928. Oct. Vol. 12. No 10 pp 440-443. With 11 text figs.

The following cases, figured in the text are reported from Siam (1) Multiple papillary adenomata of the sweat glands (2) Dermatitis cupuliformis (3) *Tinea labialis* in a betel nut chewer (4) Endothelial sarcoma of the tongue (5) Granuloma fungoides (6) Basal celled carcinoma originating in sweat glands (7) Chronic glanders. This last had been diagnosed as syphilis and as carcinoma. [These case reports are all too brief for abstraction]

W Jenkins Oliver

MEDEIROS (Mauricio) Contribution brésilienne à la connaissance de certaines mycoses tropicales. [Brazilian Contributions to the Knowledge of Certain Tropical Mycoses].—*Bull. Soc. Path. Exot.* 1928. June 13 Vol. 21 No 6. pp. 419-427

The author gives a brief general review of the work done in Brazil on tropical mycoses especially in the Oswaldo Cruz Institute and concludes that among Brazilian mycoses there are forms which (a) are clinically and parasitologically similar to European forms (b) are clinically peculiar to Brazil although the parasites are the same as elsewhere (i.e. blastomycoses) and (c) are due to special parasites which are being investigated by Brazilian workers.

P Tate.

DURKIEULH (W.) Dermatomycoses tropicales. [Tropical Dermatomycoses].—*Jl. Méd. de Bordeaux* 1928. July 10 Vol. 105 No. 13. pp 519-521

This communication gives a well condensed account of the various tropical dermatomycoses by the simple classification of the affections into two main groups A. Trichophyton dermatoses (i) Dhobieitch (ii) *T. circinata* (iii) *T. imbricata*. B Parasitic dyschromias (i) *Pityriasis versicolor flava* (Castellani) (ii) *Pityriasis versicolor nigra* (Castellani) (iii) *T. albuginea*, de Nieuwenhuis (iv) various forms of carate. Each of these subdivisions is briefly described as regards the clinical appearances and the appropriate treatment of the same

W J O

CASTELLANI (A.) The Treatment of Epidermophytosis of the Toes (Mango Toe) and Certain Other Forms of Epidermophytosis by a Fuchsin Paint.—*Lancet* 1928. Sept. 22. pp 595-596 [1 ref.]

The paint advocated for eczematoid mycotic infections of the toes and fingers and for pruritus ani et vulvae of mycotic origin consists of carbolic fuchsin 100 cc., ac. borac 1 gm. acetone 5 cc. resorcin 10 gm. The paint is applied with cotton wool to the affected parts 2-3 times daily for 1 week, then after 3 days rest re-applied 1-2 times per day for another week or over a longer period as required

W J O

DELAND (C. Mervyn) **Interdigital Ringworm.** [Correspondence]—*Brit Med J* 1928 Nov 3 p 822.

Interdigital ringworm of the feet is reported to be a common condition in Santa Cruz, British Solomon Islands occurring mainly in white men working in deep mud or in salt water. The writer detected a ring worm fungus apparently the common *Tinea imbricata*. For treatment a 5 per cent copper oleate ointment is recommended while the feet must be kept dry.

W J O

WHITE (Cleveland) **Mycotic Inguinal Lymphadenitis associated with Superficial Fungus Dermatitis of the Feet. II. Studies in Mycotic Dermatitis.**—*Arch Dermat & Syph* 1928 Aug Vol. 18 No 2. pp 271-275 [4 refs.]

Report of a case concerning a male of enlarged inguinal glands in association with ringworm of the toes and feet. The fungus was observed microscopically both in the scales from the skin lesions and in the fluid aspirated from a gland. Cultures from each area were positive showing *Trichophyton interdigitale*. A blood culture was negative for fungi. Out of 648 cases of superficial ringworm (mostly of the feet) 7 presented varying degrees of inguinal adenopathy, three of which had in addition some fever and mild constitutional symptoms and one case showed unilateral axillary adenopathy secondary to an acute eruption on the fingers.

W J O

CATANEI (A.) **Trichophytie expérimentale à *Trichophyton violaceum* du singe d'Algérie** [Experimental Trichophytosis of the Algerian Monkey with *Trichophyton violaceum*].—*C R Soc Biol* 1928 June 29 Vol 99 No 22. pp 292-293 [Pasteur Inst Algiers.]

Two Algerian monkeys (*Macacus mutus*) were inoculated by scarification with *Trichophyton violaceum* Bodin [*Bodinia violacea* (Bodin)]. Inoculations were made both with parasitized hairs and with cultures of 27 days growth on Sabouraud's glucose agar and were positive in all cases after an incubation period of about 15 days. The lesions persisted for at least 3 months and the hairs were attacked in a similar manner to human hairs.

P Tate.

RAMOS E SILVA (J) **Sobre o pityriasis versicolor tropical. A questão das achromias parasitárias e a achromia residual.** [Tropical Pityriasis versicolor Parasitic Achromia Residual Achromia.]—*Ann Brasileiros Dermat e Syph* 1927 Dec. Vol 3 No 1-4 pp 1-11 With 6 text figs. [7 refs.]

Cases of a cutaneous affection of the face and neck associated with loss of pigmentation are described and photographs illustrate the condition. Mycellal growth was found but culture on Sabouraud's medium was not successful. The author discusses the differences between Pityriasis versicolor which does not attack the face and is readily cured, and *Tinea flava* of which these cases were probably examples clearing up with local application first of resorcin later of diluted tincture of iodine. In one case there was associated with the

cutaneous achromia a macular hyperchromia of the buccal mucosa. He mentions also the fact that other cutaneous affections pinta for example, may after clearing leave areas permanently deficient in pigment

H. Harold Scott.

SMITH (E. C.) *Tinea Flava* (Castellani) — *Jl Trop Med & Hyg* 1928. July 18. Vol. 31 No. 14 pp. 169-173 With 12 text figs. [4 refs.] [Med. Research Inst Lagos]

Contains a very brief description of the clinical appearances of the affection. Emphasis is laid upon the invariable localization of the macular lesions about the hair follicles. Attempts to infect the unscarified normal skin of both Europeans and Africans with scales from infected persons and with cultures of the fungus were negative. The cultures on Petroff's media were greyish white in colour with a structural formation resembling rock coral. These showed various sized yeast-like gram positive bodies, many having a shape suggestive of ninepins. In old cultures (60 days) short hyphae were present in connexion with some of the bodies. This article is well illustrated.

W J O

HOFFMANN (W. H.) *Die Chromoblastomykose in Cuba* [*Chromoblastomycosis in Cuba.*] — *Arch f Schiff- u Trop Hyg* 1928. Sept. Vol. 32 No 9 pp. 485-487 [Finlay Lab., Health Ministry Havana, Cuba.]

A piece of infected skin from a case in the interior of Cuba was sent to the author for investigation. Clinically the condition appeared to be blastomycosis and histological examination resulted in a diagnosis of *Chromoblastomycosis* or "Tropical blastomycosis, which is supposed to be caused by the fungus *Phialophora verrucosa*. He thinks that this disease is the same as the disease of unknown origin called "Chappe, cases of which were described by GUTIERRES in Cuba in 1904 and by READ from West Africa in 1901. He believes that further investigation will prove that chromoblastomycosis is not confined to the skin but involves bones and joints, and becomes a generalized, mutilating, disease as in other blastomycoses.

P Tate

BUSCHKE (A) & JOSEPH (A.) *Dermatitis verrucosa* (*Chromoblastomycose*). [*Dermatitis verrucosa* (*Chromoblastomycosis*).] — *Dermatol Woch.* 1928. July 28. Vol. 87 No 30 pp. 1047-1049 With 4 text figs. [R Virchow's Hosp Berlin.]

The authors investigated material obtained by biopsy from HOFFMANN's case in Cuba [see above]. *Dermatitis verrucosa* was first observed by PEDROSO and GOMES in Brazil in 1911 and was later found in N. America, several times in central Brazil, French Guiana and Rhodesia. As they have heard of a case from South Russia they consider that it may be widely distributed.

The disease nearly always affects bare-footed natives, especially agricultural labourers and the parasite, which presumably lives saprophytically in nature enters through a superficial wound. It runs a very chronic course and starts as small whitish tubercles, which

unite to form cauliflower like proliferated masses with cornified surfaces and soft centres. Legs hands and feet may be affected but neither the mucous membrane nor internal organs are ever invaded.

The authors histological investigation confirms the account of ROCHA DA LIMA (1923). There is a strong cellular infiltration of the cutis which sends pointed proliferations towards the epidermis which become cornified at their extremities. A characteristic feature is the presence of sharply-defined nests of epithelioid cells in which either lying free between the pus cells or enclosed in giant cells are roundish or angular brown double-contoured yeastlike cells. On ordinary media bluish grey colonies developing sclerotia and spores are formed. According to THAXTER the fungus belongs to the sub-family *Chalaraceae* of the *Dematiaceae*. To this group also belongs the fungus found by TERRA TORRES and FONSECA & LEÃO named *Acretheca pedrosi* which causes a dermatitis with a similar clinical aspect. Treatment with potassium iodide is of use in both conditions.

P Tate

Fox (Howard) Carate (Pinta) as observed in Colombia, South America.—*Arch Dermat & Syph* 1928 Nov Vol 18 No 5 pp 673-688. With 10 text figs [10 refs]

A brief description of the disease as recounted in the literature is followed by a general account of the author's personal observations of fifty cases of the bluish carate with depigmentation. A feature especially striking was a peculiar fine reticulated mottled or variegated appearance of some of the lesions partly due to partial depigmentation and partly to bluish or brownish hyperpigmentation. In every case the eruption involved the extremities though the palms and soles showed nothing that could be definitely regarded as a manifestation of carate. Both itching and scaling were inconspicuous features. Epidermal scrapings from 20 patients revealed the presence of fungus in only one slide on microscopical examination. Of the various moulds grown culturally *Aspergillus* was most frequently found, *Penicillium* other higher fungi and unidentified *Trichophyton*s were grown in a dozen cases. Histological investigation showed vacuolization of the rete cells, absence of elastic fibres in the papillae and in the subpapillary region and pigmentary dystrophy. In two cases a large number of chromatophores were observed in the perivascular infiltration of fibroblasts in the subpapillary area. While the disease apparently was not a contagious one its aetiology was undetermined, climatic conditions and lack of proper hygiene being probable predisposing factors.

W J O

REGISTER (J C) Wassermann, Kahn, and Meinicke (M. T. R.) Reactions in Carate.—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 262-263 [1 ref]

MENK (1926) found 69.5 per cent of 67 cases of carate (pinta) to be strongly Wassermann positive. These cases were all under treatment for ailments other than carate. The author has tested the blood serums of 207 otherwise apparently healthy cases of carate in various stages—blue black, red, and white lesions of the skin occurring either alone or in some combination. The Wassermann test was applied to

all 207 cases, the Kahn test to 117 and the Meinscke (M. T. R.) to 148 of them. The Wassermann was strongly positive in 80.6 per cent. Kahn in 81.1 per cent. and Meinscke in 74.4 per cent.

[An editorial note disclaims belief that this high rate of strongly positive reactions confers on carate the distinction of being a peculiar manifestation of syphilis.]

H. M. Hanschell.

DELAMARE (G.) & GATTI (C.) L'évolution des kystes de la piedra paraguayenne. [Development of Cysts of Paraguayan Piedra.]—*C. R. Acad. Sci.* 1928. June 18. Vol. 186. No. 25 pp. 1771-1772.

A biological description of the evolution from the adult mycelial cells of the cysts of Horta which in their turn give rise to rape-seed-like elements (generally 6-12 from each cyst) with a double contour some of which by transverse fragmentation of the protoplasm come to resemble a segment of mycelial hypha. No cultures had been obtained from these bodies. The number of such elements is too variable to furnish any absolute differentiation between the two varieties of *Trichosporum Horta*.

W. J. O.

INDIAN MEDICAL GAZETTE. 1928. Aug. Vol. 63. No. 8 pp. 453-455—*Mycetoma Infection: an Appeal for Material.*

Workers all over India are requested to send mycetomic material in the form of cultures, infected tissues, clinical notes, information and photographs of cases to—Lt.-Col. H. W. ACTON, I.M.S. Director Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

In making cultures the grains, if possible, should be taken only from sinuses which have not been opened up, and, if the pustule is open, the grains should be washed in saline and then heated in saline at 56° C. for 10 minutes. Two grains should be planted on each tube of medium and at least 3 tubes should be inoculated from each case. Either of the following media may be used—Sabouraud's maltose agar, maltose 4 gm., peptone (Chassaigne) 1 gm., agar 2.5 gm., distilled water 100 cc. Whey agar, whey 250 cc., peptone 5 gm., saccharose 7.5 gm., urea 3 gm., agar 2.5 gm., distilled water 250 cc., pH 7.4. These media may be obtained from the Calcutta School of Tropical Medicine. A few grains should also be sent in saline for direct examination. Tissues for sections should be fixed in 5 per cent. formalin in normal saline, and the pieces should not, if possible, be more than 4-5 mm. thick.

P. Tate.

JEANSELME, HUET (L.) & LOTTE. Nouveau type de mycetome à grains noirs, dû à une torula encore non décrite. [A New Type of Mycetoma with Black Grains Due to a Hitherto Undescribed Torula.]—*Bull. Soc. Française Dermat. et Syph.* 1928. May No. 5 pp. 369-373. With 3 figs. [4 refs.]

This case was observed in the Saint Louis Hospital, Paris. The subject was a woman aged 49 who had always lived in Martinique and she came to France 6 years before her admission to hospital.

Three years after her arrival in France she noticed a swelling of her foot which gradually increased in size but was not painful and did not incapacitate her. On her entry to the hospital, the tumour appeared as a blackish brown mass involving the dorsal surface of the anterior interior part of the right foot. The consistency was elastic and firm and the mass was moveable on the underlying tissues but the skin was not moveable on the tumour. A number of palpable elevations appeared on the surface. A roundish hard mobile mass about the size of a nut was present on the inner face of the calf of the leg. Radiology showed that the skeleton and tendons were not invaded.

Puncture of the elevations resulted in the issue of bloody pus containing small black grains about the size of a pin's head. These grains gave cultures of a fungus after 5 days when inoculated on Sabouraud's medium.

A note by LANGERON on the mycology of the fungus is appended. He describes the grains as black very small—0.5–1 mm—and of very soft consistency. They are formed of a kind of hollow cord curled into a mass which gives them a very irregular surface as interstitial substance is absent. The cords are formed of very short hyphae and round or angular cells. Cultures from grains succeed readily at 20–22° C. and in 24 hours give colonies of black down with a greenish reflection. Pigment is not secreted into the medium and neither sclerotia nor chlamydospores are formed. These characters are sufficient to distinguish it from all other mycetomas with black grains.

In culture the fungus forms septate deeply coloured hyphae generally arranged in coremia, and forming abundant blastospores. These characters allow it to be placed in the genus *Torula* Persoon *emend* Saccardo following the terminology of CIFFERRI. Although many species of *Torula* have been described the descriptions are too meagre to permit it to be identified with any of them and the name *Torula Jeanselmis* n.sp. is proposed for it.

P. Tate

SMITH (E. C.) *Mycetoma in Nigeria*.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928 Aug. 22 Vol. 22. No. 2. pp. 157–160. With 8 figs. on 4 plates. [5 refs.] [Med. Research Inst. Lagos, Nigeria.]

Three cases of mycetoma occurring in Nigeria are reported. Two involved the foot and one the forearm and two of the subjects were women. Numerous bright red grains were present and from them cultures of an *Actinomyces* were obtained. The parasite appears to be the same in all three cases and is identified as *Aspergillus pelletieri* (Laveran 1906) [*Actinomyces pelletieri* (Laveran 1906)].

Inoculation of monkeys, rabbits and guinea-pigs with grains and inoculation of rabbits and guinea-pigs with culture suspensions, were negative.

P. Tate

VOIZARD (F.) & LEROY (D.) Un cas de pied de Madura traité avec succès par des injections intraveineuses de lugol. [Case of Madura Foot treated successfully with Lugol].—*Bull. Soc. Path. Exot.* 1928 July 11 Vol. 21 No. 7 pp. 511–515 [4 refs.]

Case report concerning a native soldier from Madagascar resident two years in France from whose lesions on the right foot the *Madurella mycetozooea*

(Laveran) was isolated by culture. Healing was effected by 18 intravenous injections (Feb 5th-April 23rd.) of iugol solution, the dosage commencing with 1 cc and rising to 10 cc solution with an equal amount of distilled water

W J O

PALMER (F J). A Second Case of Madura Foot treated by Chemotherapy with Apparent Cure.—*Indian Med. Gaz* 1928. Sept. Vol. 63. No 9 pp. 530-531 With 2 text figs.

Case report to illustrate the efficacy of chemotherapy. The oral administration of zinc and copper citrate produced definite amelioration. Apparent cure with no recrudescence after 7 months was attained by 6 intravenous injections of bismuth tartrate gr 2-3½ given over a period of 6 weeks

W J O

RAO (M. G. Ramachandra). A Case of Mycetoma of the Hand and Foot.—*Indian Med. Gaz* 1928. June Vol. 63 No 6 pp 329-330 With 1 text fig

Brief clinical report of a male native aged 30 years, with mycetoma of the right hand and left foot of 2 years and 6 months duration respectively [No bacteriological record is given]

W J O

TAKAHASHI (Shinkochi). [On Erythema of the Axilla by Trichomyces palmelina. A Contribution to the Knowledge of the Causative Agent of Trichomyces palmelina Pick.].—*Hjuku Haseiokoku Zasshi (Jl Dermat & Urol)* 1928 Jan Vol 28 No 1 [Summarized in *Japan Med World* 1928 May 15 Vol 8 No 5 p 128]

From a study of the pathological histology of Trichomyces palmelina, the author concludes that not only the shaft but also the root of the hair is infected and that the fungus of which he isolated the culture is an *Actinomyces*

P Tate

SEQUEIRA (J H.). Prickly Heat and the Seborrhoides.—*Kenya & East African Med Jl* 1928 Sept. Vol. 5 No 6 pp. 207-210 [2 refs.]

In this review attention is drawn to the similarity of the morphological features of the fungus described by SMITH (this *Bulletin* Vol. 24 p. 447) to those of the *Pityrosporum malassei*. It is noted that the initial lesion experimentally produced by the former organism is a vesicle and by the latter a papule while both types of skin eruption are beneficially treated by antiseptics.

W J O

VON BASSEWITZ (E.). Die südbrasilianische Aroera Krankheit (Dermatitis venenata phytogenes) [Aroera Disease of Southern Brazil, a Dermatitis Venenata].—*Arch. f. Schiff- u. Trop. Hyg* 1928. Oct Vol. 32. No. 10 pp 494-500

An account of the dermatitis occurring among predisposed persons coming in contact with the "aroera" tree, which tree is difficult to

place in botanical classification. The toxic effects of the tree have for long been known to the natives, and have given rise to legendary tales among them. The causative factor of the dermatitis remains unestablished, the two older theories of an irritant from caterpillar larvae or from chrysophanic acid being proved to be no longer tenable. Certain meteorological conditions such as a barometric fall and a rise in atmospheric humidity appear to favour the occurrence of the disease, which is more frequent in the spring and among those individuals who show a hyperaemic and sweating skin. With a duration of 5-10 days the affection may be divided into the four stages of incubation, invasion, vesiculation and desquamation. Only rarely has a pustular stage been reported. Oedema of the affected parts may be extreme especially of the face and of the male external genitals. The itching is intense occurring in paroxysmal attacks and accompanied by general symptoms of malaise with only occasional slight fever. Local paraesthesia in the areas involved is common and may persist for a time. Attempts to produce desensitization by non-specific protein injections have proved worthless. Injections of a distillate and of an alcohol-etheral extract of the leaves produces a severe local reaction. Internal medication by homoeopathic doses of the same tincture has given gratifying results as far as the short period of 10 months allowed a verdict. Both clinically and etiologically the condition belongs to the large group of Anacardiaceous dermatoses with which it has many points in common.

W J O

DI LULLO (O) Le paa] dermite provoquée par le quebracho rouge (*Schinopsis lorentzii*) [Paa], a Dermatitis provoked by the Red Quebracho.]—C R Soc Biol 1928 Oct 5 Vol 99 No 27 pp 1000-1001

Brief account from Santiago of a dermatitis with intense local pruritus and associated with general symptoms occurring among persons sensitive to the red quebracho tree (N O Anacardiaceae). The affection lasts for 5 to 10 days without producing any apparent immunization. A benign attack could be produced in the case of such individuals by friction with an alcoholic extract and water distillate of the leaves the more intense reaction being induced by the alcoholic tincture.

W J O

MCCULLOCH (W E) Ulcers in Northern Nigeria—a Review and a Theory—West African Med. JI Lagos 1928 July Vol 2. No 1 p 96 & pp 101-102 104-106 [6 refs.]

This interesting and suggestive communication should be read in its entirety as it hardly lends itself to abstraction. Secondary infection plays a very large part in the majority of tropical ulcers whatever may have been the initial pathogenic factor. Some 18 primary lesions are briefly mentioned and described. Concerning acute suppurative mastitis it is suggested that the *Staphylococcus tetragenus* may be the cause in some instances of elephantiasis of the breast and arms.

Absence of resistance with low virulence of the infective organisms

are the only conditions which fit the tropical ulcer. Biochemical investigations showed in natives (1) a high blood-sugar without glycosuria, (2) a high deficiency of blood and sputum calcium (3) a low blood-urea content with a very low urinary urea content. "Therefore tropical ulcer is conditioned by (1) A chronic semi-starvation of the vast majority of the population. (2) The entrance of any mildly pathogenic organism. Tropical ulcer is a dietetic ulcer and the question of causative organisms need not be considered at all. Such premises suggest a rational line of treatment which is shortly described.

W J O

DALRYMPLE (J) Tropical Ulcer and Dietary [Correspondence]—*West African Med J* Lagos. 1928. Oct. Vol. 2 No. 2 p. 133. [1 ref]

This letter written in support of McCulloch's contention of the dietary deficiency of natives being a main factor in the aetiology of 'tropical ulcer' recounts the diminution in the occurrence of the affection among underground miners on the Gold Coast following the provision of an improved and varied scale of diet with its vegetable adjunct. It is recorded also that the use of the bathing facilities provided was urged upon the native workers.

W J O

RODHAIN (J) Note au sujet d'une dermo-épidermite papuleuse épidémique du Bas-Congo [An Epidemic Papular Dermo-epidermosis in Lower Congo].—*Bull Soc Path Exot* 1928. May 9 Vol. 21 No 5 pp. 383-396. With 1 text fig [School of Trop. Med. Brussels.]

Description of an apparently new dermatosis occurring chiefly on the instep or dorsal surface of the foot and consisting of a well defined raised papule on an infiltrated base with a central vesicle leading to superficial ulceration, surrounded by an erysipelatous zone of varying extent. The evolution of the lesion is completed in about 14 days, may be accompanied by fever and in the case of Europeans by a local or generalized roseolar eruption, while the glands draining the area are enlarged but do not suppurate. Observed mainly during the moist warm months March and April, the sites affected suggest inoculation of the virus through insect bites. Most often there is only one single papule and in the case of the natives this is situated on the uncovered parts such as the scalp. No bacilli have been detected in the pus from unopened lesions. cultures from the same were indefinite. Inoculation experiments reproduced similar lesions in 3 monkeys. Histological examination shows a thickening and necrosis of the stratum Malpighii, an infiltration of the papillae, true skin and hypodermis consisting of mononuclear and eosinophile cells. The necrosis only rarely extends into the true skin. While probably of streptococcal origin the infecting agent has yet to be determined. By its clinical evolution and histological picture the condition is to be differentiated from CASTELLANI's tropical echthyma. The designation Bouton de Borna is put forward.

W J O

NOEL (P) Le lupus érythémateux dans les races noires [*Lupus erythematosus in the Black Races.*].—*Ann Dermat et Syph* 1928 May 6 Ser Vol. 9 No 5 pp 372-377 With 1 fig [7 refs]

Interesting case report from Pondicherry of a Hindu woman aged 30 years with the affection of 6 months duration on the face scalp and limbs. The lesions consisted of depigmented plaques with atrophy and scarring of the skin the surface covered with thick horny scales showing horny follicular plugs on removal. The condition was extensively distributed in butterfly pattern over the nose and cheeks on the supraorbital regions scalp and extensor aspects of the upper limbs. Both lips showed white spots. On the feet the lesions of only 3 months duration consisted of achromic macules without any hyperkeratosis or atrophy. No adenopathy no abnormal physical signs in the lungs. According to her own statement the patient's husband now dead, had had similar lesions prior to marriage. Comment is made on the rare occurrence of the disease among the coloured races which fact does not allow the description of any peculiarities of the affection in the few cases reported.

W J O

RAMOS E SILVA (J) A questão do lupus erythematosus entre os negros. Contribuição para uma Dermatologia ethnica, a proposito de um artigo de P Noel. [*Lupus Erythematosus in Negroes.*].—*Brasil Medico* 1928 Sept 1 Vol. 42. No 35 pp 983-985 With 4 text figs.

In response to the hope expressed in NOEL's article that others would record similar cases, the authors looked over the returns of the Dermatological Clinic in Rio de Janeiro and confirm the rarity of lupus erythematosus in negroes. Among 17 950 patients there were 67 suffering from this disease and of these only three were negroes and 12 mulattos. Brief notes are given of one negro (male) and 2 mulattos (both females). The first suffered from syphilis also. The face lesions had persisted for 16 years and at the Clinic were being treated with carbonic acid snow. The second presented typical lesions on the face and in addition a large patch involved half the scalp. The disease began 8 years previously and got worse in spite of treatment by ultra violet rays carbonic snow tuberculin, chaulmoogra etc. Subsequently intravenous injections of kryzogan and triphal have led to some improvement. The third case presented a circinate infiltration thought at one time to be leprotic. Nothing further is mentioned about this patient.

H Harold Scott

DIONISIO GUTIERREZ (Perpetuo) & HIZON (Jose) Mongolian Blue Spots among Filipinos.—*Jl Philippine Islands Med Assoc* 1928 Sept. Vol. 8 No 9 pp 380-383 [6 refs.] [College of Med. Univ of the Philippines]

The greater part of this interesting communication comprises an attempt to trace the Mongolian ancestry of the Filipinos. It may be inferred that the forefathers of the Filipinos came from Sumatra Borneo or Johore. Among 346 babies examined 291 (84.10 per

cent.) showed blue spots. After the age of 5 years they were seldom found. Concerning the site 74 per cent. were observed over the sacrum, 10.96 per cent. in the lumbosacral region or waist and 10 per cent. about the lumbar region. A single spot was the rule multiple spots were found in over 13 per cent. of the cases examined.

W J O

STROGO (W. M.) The Treatment of Scabies. [Correspondence].—*Med J. Austral.* 1928 May 19 15th Year Vol. 1 No 20 p 631

A case of *kunikuh*, a disease probably identical with scabies involving all the body cleared up completely a week after 3 grams bismuth tartrate had been given intramuscularly

A G B

PANAYOTI C (Angelica) A Case of Very Extensive Leiodermis.—*Trans Roy Soc Trop Med & Hyg* 1928 June 30 Vol. 22 No 1 p 89
With 1 fig

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

PLAUT (F) Das Nervensystem als Bildungsstätte für Antikörper bei Rekurrens. [The Nervous System as the Site for the Formation of Antibodies in Relapsing Fever]—*Nien Klin Woch* 1928 July 12, Vol. 41 No 28 pp 1005-1009 With 2 text figs. [13 refs.] [German Research Inst for Psychiatry Kaiser Wilhelm Inst Munich]

The results of a study of two patients infected with relapsing fever showed that in both cases antibodies were present in the serum and cerebro-spinal fluid. Weekly examinations were made of these two fluids and it is seen that the antibody formation starts earlier attains a greater intensity and lasts longer in the serum than in the cerebro-spinal fluid. The author's observations indicate however that the invasion of the nervous system by spirochaetes is followed by the formation of specific antibodies as shown by their appearance in the cerebro-spinal fluid. In view of the theory that immune bodies are built up by the reticulo-endothelial system it will be of interest to determine which part of the brain is concerned in the formation of the immune bodies against relapsing fever spirochaetes.

E. Hindle

ROSENHOLZ (H. P.) OWSJANNIKOWA (O. W.) & TREFILOW (I. A.) Ueber die neurotropischen Eigenschaften der Rückfallfieber spirochäten und die Therapie der Neurospirillosen [On the Neurotropic Properties of Relapsing Fever Spirochaetes and the Treatment of Brain Infections.]—*Russian Jl Trop Med* 1928 Vol. 6 No 4 German summary p 280 [In Russian pp 249-259 39 refs.]

The authors have studied this property in *S. recurrentis* and *S. duttoni* (Frankfurt strain) and find that the neurotropism shown by these organisms depends primarily on the possibility of their being able to enter the nervous tissue and secondly on being able to live in a kind of symbiotic relation with this tissue. ['Neurobiose']

The neurotropic property is not directly correlated with the virulence of the organism. By passing a needle into the brain of a mouse and then inoculating the animal in the ordinary way with either *S. recurrentis* or *duttoni* infection of the nervous system was invariably obtained. Such animals could not be sterilized by injections of any salvarsan preparations.

In trying to obtain more efficient therapeutic agents it is recommended that compounds should be tested on brain infections in mice easily produced in the manner indicated above which at present do not respond to any known treatment

E. H

KROÓ (H.) Schlussbemerkungen zu einigen Arbeiten über experimentelle Rekurrens. [Experimental Relapsing Fever Control.]—*Ztschr f Hyg u Infektionskr* 1928, Apr 30 Vol 108, No 3 pp 617-620 [17 refs.] [Robert Koch Inst Berlin.]

PRIGGE (R.) & ROTHERMUNDT (M.) Entgegnung auf die vorstehenden Bemerkungen von Dr. Kroó—*Ibid.* pp. 621-626 [15 refs.] [State Inst. of Experim. Therap., & 'Georg-Speyer' House Frankfurt a.M.]

Polemical articles on the persistence of relapsing fever spirochaetes in the brain and its bearing on chemotherapy and general questions of immunity. It is unnecessary to give details of these arguments, which are mainly repetitions of views that have already appeared in this *Bulletin*.

The extent to which brain infection develops in animals infected with blood spirochaetes, whether a widespread phenomenon, as suggested by Kroó or rather exceptional as stated by Prigge and Rothermundt whether brain infections can withstand chemotherapeutic agents or not whether results obtained with relapsing fever are applicable to syphilis or not and questions of immunity in spirochaetosis are discussed with considerable acrimony. [In the opinion of the reviewer Kroó has the better of the argument.]

E. H.

MARKOFF (Wl.) Hautexanthem bei Rückfallfieber (Exanthem in Relapsing Fever)—*Seuchenbekämpfung* 1928, Vol. 5, No. 3, pp. 166-169

The author studied the features of this disease in a large epidemic amongst the Bulgarian troops at Gallipoli during the Balkan War and, later a second epidemic in north-eastern Bulgaria. In both cases a large proportion of the patients showed haemorrhagic exanthemata, and evidence is adduced in support of the view that these symptoms are not the result of a mixed infection, as suggested by BAXS and others, but entirely the result of this type of relapsing fever.

A careful bacteriological study was made of a number of patients showing these symptoms including the author himself the Weil-Felix and Widal reactions were negative as well as cultures and thick drop examination for malaria.

The exanthem generally appeared during the first attack, and took the form of intense red spots which were not affected by pressure. They were especially frequent on the arms and legs then on the chest but only rarely in the back. After becoming about the size of a pea and purple red in colour they disappeared in three or four days.

The symptoms of relapsing fever were found to depend mainly on the virulence of the particular strain of *S. recurrentis* and secondarily on individual disposition. When the exanthem was present it appeared earliest in the severe cases, but often only two or three haemorrhagic spots could be seen which later developed into the characteristic exanthem.

E. H.

BERGSMAN (Stuart) Relapsing Fever in Abyssinia.—*Jl Trop Med. & Hyg* 1928 Nov 15 Vol. 31 No 22 pp. 289-290.

An account of cases of relapsing fever twelve of which occurred in one hut. As a general rule the injection of 0.6 to 0.75 gm. of neosalvarsan or novarsenobenzol prevented any relapses and the patients

made an uninterrupted recovery. In two cases complications were observed: one patient had jaundice for five days accompanied by hiccough and another a two year old child had a parotid abscess and sloughs on the buttocks and thighs. Both *Ornithodoros moubata* and *O. savignyi* occur in Abyssinia and the housing conditions are such as to favour the rapid spread of this disease.

E H

RUGE (Heinrich) Ueber zwei Fälle von Rückfallfieber mit einigen biologischen Besonderheiten. **Two Cases of Relapsing Fever with Biological Peculiarities.**—*Arch f Schiff's u Trop Hyg* 1928 June Vol. 32 No 6 pp 316-320 With 2 charts in text [Inst for Ship & Trop Diseases Hamburg]

A record of two cases of Moroccan relapsing fever: one acquired in nature and the other a laboratory infection of the author himself after the strain had been passed through eight mice. In both cases facial paralysis of the right side developed between the third and fourth relapses thus confirming the views of earlier observers that this strain of relapsing fever often produces lesions of the peripheral nerves. In the second case the infection caused the reappearance of an abscess in the middle ear which had been affected about ten years previously. The administration of a total of 14.50 gm of stovarsol failed to prevent the occurrence of four relapses. In this connexion the author remarks that six years previously 0.3 gm produced a marked exanthem whilst on this subsequent occasion no ill effects were observed.

E H

RUGE (Heinrich) Einige Bemerkungen zur Behandlung des Rückfallfiebers mit Spirozid. [Treatment of Relapsing Fever with Stovarsol.]—*Dermat Woch* 1928 Sept 15 Vol. 87 No 37 pp 1302-1304 With 1 chart [3 refs] [Inst for Ship & Trop Diseases Hamburg]

The author calls attention to the treatment of relapsing fever in himself [see above] in which 14.50 gm of stovarsol, equivalent to about 6 gm of neosalvarsan, were administered without destroying all the spirochaetes. As a result the use of this substance as a prophylactic agent against syphilis seems to be of doubtful value.

E H

BRUYNOGHE (R) & DUBOIS (A) Immunité et diversité des souches dans l'infection expérimentale à *Spirochaeta duttoni*. [Immunity and Diversity of Strains in Experimental Infections with *S. duttoni*.]—*C R Soc Biol* 1928 May 4 Vol. 98 No 14 pp 1247-1248 [2 refs]

The authors find that in mice recovered from infection with *S. duttoni* the resulting immunity lasts at least six months and is probably of long duration. It is necessary however to employ the same strain of spirochaetes to test this immunity and the diverse opinions on this subject are probably the result of using strains which were not strictly homologous.

E H

- NICOLLE (Charles) & ANDERSON (Charles) Présence au Maroc du spirochète de la fièvre récurrente d'Espagne [The Presence in Morocco of the Spirochaete of Spanish Relapsing Fever.]—*Arch Inst Pasteur de Tunis* 1928 June Vol. 17 No. 2 pp 83-107 With 1 text fig & 2 charts in text. (1 ref.)

This paper is an extension with experimental details of that reviewed in this *Bulletin* Vol. 25 p 586. The authors propose the name *Spirochaeta hispanica* var *marocana* for the causative organism.

E. H.

- MATHIS (C) Identité à Dakar du spirochète des rats du spirochète de la musaraigne et du spirochète récurrent humain [The Identity at Dakar, of the Spirochaetes from Rats, Shrew Mice and Cases of Human Relapsing Fever.]—*Bull Soc Path Exot* 1928, June 13. Vol. 21 No. 6 pp 472-485 With 2 text figs [24 refs.] [Pasteur Inst. Dakar French West Africa]

- Identité du spirochète de la fièvre des tiques (*Sp. duttoni*) et des diverses souches de spirochètes récurrents dakarois. [The Identity of the Spirochaete of Tick Fever (*Sp. duttoni*) and the Various Dakar Strains of Relapsing Fever Spirochaetes.]—*Ibid* July 11 No. 7 pp 585-593 (3 refs.) [Pasteur Inst. Dakar]

After numerous publications on this subject accompanied by voluminous tables giving the results of cross immunity experiments, the author has changed his views as to the distinctness of the Dakar strains of spirochaetes and now agrees with NICOLLE and ANDERSON that they are identical with *S. duttoni*. Consequently *Spirochaeta crocidurae* becomes a synonym of that species.

E. H.

- IWANOWA (D. A.) Ein Fall von Laboratoriumsinfektion mit Rückfall fieber durch die Conjunctiva [A Case of Laboratory Infection with Relapsing Fever through the Conjunctiva.]—*Klin Woch* 1928, Sept 9 Vol. 7 No. 37 pp 1742-1743 (13 refs.)

The record of a laboratory worker who accidentally received in his eye a drop of a culture of spirochaetes, and eight days later developed an attack of relapsing fever.

E. H.

- GRAY (J. D. Allan) Accidental Infection with *Treponema duttoni* — *Ann Trop Med & Parasit* 1928 Nov 9 Vol. 22 No. 3 pp 273-289 With 1 fig (57 refs.) [Bact. Dept., Univ., Edinburgh]

A lengthy and detailed account of a laboratory infection with tick fever. The data suggest that the author was infected on two occasions, first probably from blood containing spirochaetes getting on to his fingers and secondly from the bite of an infected mouse. Eight pyrexial attacks were experienced and two abortive ones. It is of

interest that the blood still contained spirochaetes as shown by inoculation into mice 32 days after the last rise of temperature. Treatment with novarsenobillon had no obvious effect on the course of the disease. The serum taken at various intervals after recovery failed to protect mice from infection and produced neither lysis nor agglutination in the spirochaetes of successive attacks in mice.

E H

MELNEY (Henry Edmund) *Relapse Phenomena of Spirochaeta recurrentis*—*Jl Experim Med* 1928 July 1 Vol 48 No 1 pp 65-82. With 1 chart & 1 text fig [14 refs.] [Peking Union Med College Peking China]

The author found that the gray squirrel *Sciurotamias davidianus* and the striped chipmunk *Eutamias asiaticus* could both be infected with the Chinese strain of relapsing fever but no relapses occurred in normal animals. After splenectomy however the intensity of the infection was increased and one or two relapses appeared.

The original strain of spirochaetes was transferred from one squirrel to another by inoculation of blood taken at the height of the first attack. When relapses occurred these were also transferred to separate series of animals and in turn when these had relapses they were similarly treated. In this way six strains of spirochaetes were isolated which retained their specific agglutination characteristics as long as they were kept under observation.

The sequence of these strains in the relapses was not always the same sometimes new ones were produced and at other times they reverted to an older strain. The related strains were always those which appeared, or might have appeared in alternate attacks and only once did related strains appear in two consecutive attacks. Squirrels whose spleens had not been removed, and who consequently showed only one attack, developed immune bodies only against the strain inoculated or against closely related strains. In principle the results agreed with the view that when Strain 1 is inoculated Strain 2 appears in the relapse, and when the latter is inoculated Strain 1 appears in the relapse [see CUNNINGHAM this *Bulletin* Vol. 23 p 112] but with later strains there was a widening zone of antibody formation and it was found possible by reinoculation to infect squirrels with four different strains in succession.

The spleen has a protective influence against the development of relapses but does not control the formation of specific immune bodies.

Finally the author points out that quite different immunological strains of *Spirochaeta recurrentis* can be isolated from human cases of Chinese relapsing fever occurring in the same locality and he aptly remarks that at present there is no justification for the division of relapsing fever spirochaetes into different species.

[The relationship between the original and relapse strains of spirochaetes does not seem to consist of a simple alternation of two types as originally supposed, but is a much more complicated phenomenon. The author's results should be compared with those obtained by GORI, and by BRUSSIN and ROTOWA, *loc cit* Vol. 25 pp 588 and 589.]

E H.

NICOLLE (Charles) & ANDERSON (Charles) Un nouveau spirochète récurrent pathogène pour le cochon *Sp. sogdianum* transmis par *Ornithodoros papillipes*. A New Relapsing Fever Spirochaete, *Sp. sogdianum* Pathogenic for Guinea-Pigs, transmitted by *O. papillipes*.—C R Acad Sci 1928. Oct 29 Vol 187 No 18. pp 746-748

With *Ornithodoros papillipes* received from Bokhara Russian Turkistan the authors have produced a spirochaetal infection in guinea-pigs which seems to differ in its properties from any previously described. As a rule the guinea-pig is not very susceptible to relapsing fever spirochaetes but *S. sogdianum* is markedly pathogenic for this animal. When infected by the bites of infected ticks there is an incubation period of 7 to 8 days followed by two to four febrile attacks, each terminating in a crisis. In each attack there is a gradually increasing number of spirochaetes until the crisis. A monkey (*Macacus cynomolgus*) was infected by blood inoculation and showed three attacks and spirochaetes were observed only in the first attack.

The virus can easily be maintained by passage through guinea-pigs, either by direct blood inoculation or the medium of ticks. Cross immunity experiments show that this spirochaete is distinct from *S. hispanicum* and its Moroccan variety also from *S. duttoni* and *S. normandi*.

In nature transmission is by *Ornithodoros papillipes* but *S. sogdianum* can also be transmitted by *O. moubata* and *O. normandi*.

An attempt to transmit the infection from one monkey to another by means of lice was negative.

E. H

NICOLLE (Charles) ANDERSON (Charles) & COLAS-BELCOUX (Jacques) Premiers essais d'adaptation du spirochète des poules à divers Ornithodores. First Attempts to adapt Fowl Spirochaetes in Various Ornithodores.—C R Acad Sci 1928 Nov 5 Vol 187 No 19 pp 791-792.

The authors fed *Ornithodoros moubata*, *O. maroccanus* and *O. normandi* on fowls infected with spirochaetosis and after a week's interval refed the ticks on normal fowls, with negative results. Emulsions of the contents of the ticks were then inoculated into fowls and it was found that the spirochaetes had survived in *O. maroccanus* for at least 18 days, whilst in the other two species the virus had disappeared. Attempts to transmit the Spanish strain of relapsing fever by *Argas persicus*, gave negative results.

E. H

ANDERSON (T. E.) Récupération de la virulence du *Spirochaeta gallinarum* par inoculation d'une émulsion d'*Argas persicus* à des poussins et à des embryons de poulets. [Revival of Virulence of *Spirochaeta gallinarum* by the Inoculations of Emulsions of *Argas persicus* into Chickens and Fowl Embryoes.]—C R. Soc. Biol 1928 July 6. Vol 99 No 23. pp 378-379 [Pasteur Inst. Paris]

The author found that after repeated passages through fowls a strain of *S. gallinarum* had completely lost its virulence for adult

birds and moreover these could not be infected by *Argas persicus* that were infected with the same strain

An emulsion of some of these ticks was inoculated into eggs that had been incubated for 15 days. After another 15 days the eggs hatched and in one of the chickens numerous spirochaetes were observed in the blood. The other two chicks died but were negative.

Three chicks 2 days old were each inoculated with an emulsion of *Argas* and all showed parasites on the 5th day. On the 6th day their blood was inoculated into 3 fowls, two of which became heavily infected whilst the third remained negative.

E. H.

NICOLLE (Pierre) Etude chimiothérapique de la spirochètose espagnole chez la souris. [A Chemotherapeutic Study of Spanish Relapsing Fever in Mice.]—*Arch Inst Pasteur de Tunis* 1928 Sept Vol 17 No 3 pp 218-223

The results show that this strain of relapsing fever resembles others in its resistance to organic arsenical compounds requiring doses 20 to 50 times as great as those sufficient to cure *Trypanosoma brucei* infections. Doses of 0.004 to 0.005 gm. novarsenobenzol were found generally to effect a cure, but bismuth potassium tartrate and No 309 Fourneau were found to have no action on the spirochaetes. In view of the fact that this strain of relapsing fever has not been known to cause a fatal infection, it is recommended for therapeutic use where it is desired to employ spirochaetes.

E. H.

SCHOCKAERT (J) Action thérapeutique de l'antimoine sur le *Spirochaeta duttoni*. [The Therapeutic Action of Antimony on *S. duttoni*.]—*C R Soc Biol* 1928 July 27 Vol 99 No 25 pp 654-656 [5 refs.] [Bact Lab Univ Louvain.]

Mice infected with *S. duttoni* were given doses of 0.0025 to 0.0035 gm neosalvarsan per 20 gm body weight and in the great majority of cases showed relapses. Subsequently the effect of various antimony compounds was tested and some interesting results obtained on the influence of chemical constitution on the therapeutic efficiency. For example, stibenyl was almost without action whilst H 471 which only differs from it by the addition of a chlorine atom in the meta position, was almost as efficacious as neosalvarsan.

E. H.

SUZUKI (Seichi) Experimentelle Studie ueber Recurrensspirillen auf den Mäuse und den Ratten I. Toxitaetsversuch und Heilversuch mit Sulfoxylsalvarsan. [An Experimental Study of Relapsing Fever in Mice and Rats. Toxicity and Treatment with Sulphoxylsalvarsan.]—*Jl Oriental Med* 1928. Apr Vol. 8 No 4 German summary p 66 [In Japanese.] [Manchuria Med. College Mukden.]

The maximum dose of this compound was found to be 1.0 cc. per 10 gm. the curative dose 0.3 cc. per 10 gm. but 0.1 to 0.2 cc. caused

the disappearance of spirochaetes from the blood. Protection experiments gave negative results.

This compound is said to be less toxic and produce a more lasting effect than other salvarsan preparations.

E. H.

LAPIDARI (Mario) & SPARROW (Hélène) Sur la culture des spirochètes des fièvres récurrentes. [The Culture of Relapsing Fever Spirochaetes.]—*Arch Inst Pasteur de Tunis*. 1928 Sept Vol. 17 No. 3 pp. 191-205 With 13 figs.

The authors very aptly remark that in spite of the lengthy publications on this subject, it is very difficult to find a good description of the best way of cultivating spirochaetes. Whichever method one adopts, unexpected failures are met with even when the directions are carefully followed. After many experiments with various strains of relapsing fever spirochaetes they find that a modification of Unger mann and Galloway's method described by BRUYNOGHE (this *Bulletin*, Vol. 25 p. 585) gives the best results. As a general rule the conditions necessary for the successful cultivation of these organisms are as follows —

(1) Anaerobiosis obtained in the presence of coagulated albumen such as egg white serum, organs, in long narrow tubes the surface of the medium being covered by oil or vaseline.

(2) A medium containing albumens obtained by the addition of the fresh serum of the rabbit or horse diluted with saline.

(3) The presence of blood or pieces of fresh organs or embryonic tissues.

(4) The pH value is also of vital importance and must be adjusted to the optimum for the organism being cultivated.

The authors found that if in Ungermann's medium, Ringer's solution was replaced by Hartley's broth very much better growth of the spirochaetes was obtained and this method was the one generally employed. It is advisable to make subcultures during the first week, since if made towards the end of their growth, the cultures remain negative for long periods and gradually take longer to develop. Curves are given illustrating the growth of a number of cultures and the results obtained by making subcultures at different intervals from the beginning of the original culture. In some cases the cultures showed relapses in one series the spirochaetes being numerous about the fifth and seventh days and then completely negative the organisms reappearing after the 10th day and attaining their maxima from the 20th to the 33rd day and disappearing finally between the 37th and 45th days. The results of these experiments support the view that the relapse phenomenon in spirochaetosis is not caused by a reaction of the host but depends upon some specific property of the organism itself.

E. H.

CARROZZE (J. A. B. B. J.) Chronique des bronchospirochaetoses, à propos d'une épidémie. [A Record of Bronchospirochaetosis, in Connection with an Epidemic.]—*Arch Méd et Pharm. Mishi* 1928 Aug Vol. 89 No. 2 pp. 201-207.

During 1927 the author observed 50 cases of this infection in Morocco and as a result of his observations inclines to the view that it is caused by invasion of the bronchi by Vincent's spirochaete.

Six cases of Vincent's angina without any bronchial symptoms were observed and in addition the following clinical types in which the spirochaetes were found in the sputum

- (1) 6 cases of pneumonic or broncho-pneumonic forms closely resembling influenza.
- (2) 39 cases of bronchitis associated with the presence of fusiform spirochaetes.
- (3) 5 cases of bronchitis with bloody sputum following typical Vincent's angina.

The examination of 14 Indo-Chinese hospital attendants showed the presence of 8 carriers of fusiform spirochaetes in the mouth. Out of 14 Arabs and Berbers only 2 were carriers and 14 Europeans showed only one carrier. All the patients were treated by stovarsol, 1 gm per day for 20 days and adrenalin 30 drops of a 1/1000 solution for 10 days. The pneumonic forms were also treated by repeated injections of 0.15 gm novarsenobillon.

All attempts to cultivate the spirochaetes were negative.

E H

RAIMONDI (Silvio) & CANAL FEIJÓO (Enrique J.) *Espiroquetosis del aparato respiratorio* [*Spirochaetosis of the Respiratory Tract.*]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires 1928 Vol. 4 Nos 28-31 pp 384-393. [Also issued as *4a Reunión Soc. Argentina Patol. Regional del Norte Santiago del Estero* 7, 8 y 9 Mayo 1928 pp 384-393.]

Respiratory spirochaetosis appears to be common in Santiago del Estero. The authors have seen 27 cases within 5 months and they give brief details of eleven.

Among 287 patients seen at the Dispensary between Dec. 1st 1927 and April 24th 1928 there were 9.27 per cent having this condition. The proportion to cases of tuberculosis was 1.6:1 not counting in any cases of tuberculosis harbouring spirochaetes. Of the 27 specially referred to 19 were females. The main symptoms were cough sometimes (not always) with expectoration pain in the chest troublesome but not acute profuse nocturnal sweats not much loss of weight usually 2-3 kilos in 8 months but in one instance 8 kilos. Blood is often present in the sputum but never abundant. The physical signs are trivial and there is no rise of temperature. The characters of the sputum are its opacity early lysis of any blood present and early decomposition.

Stovarsol results usually in disappearance of the organisms and the symptoms. The authors conclude that all patients with pulmonary complaints should be examined for this condition that it is endemic in Santiago del Estero that *formes frustas* are common, and that the disparity between subjective and objective signs should indicate examination of the sputum for the spirochaetes. [With so indefinite a condition the question naturally arises: Is this a morbid entity at all? Secondly, why is no experimental work undertaken to prove or disprove the pathogenicity of these abundant spirochaetes?]

H Harold Scott.

WORTZ (Isaac) Dos casos de bronquiespirochaetosis de Castellani. [Two Cases of Bronchial Spirochaetosis.]—*Bol Inst Clin. Quirrig* Buenos Aires. 1928. Vol 4 Nos. 23-31 pp 394-399 With 2 text figs. [Also issued as *la Reunión Soc Argentina Patol Regional del Norte Santiago del Estero* ~ 8 y 9 Mayo 1928 pp. 394-399 With 2 text figs.]

The first patient was a man of 31 years. His illness began in 1920 with pain in the right shoulder and yellowish, loose expectoration. No tubercle bacilli were found. In 1926 the sputum contained blood for the first time and in July 1927 there was free haemoptysis. There was no fever and the physical signs in the thorax revealed no disease. Spirochaetes were abundant in the sputum but cleared up on administration of neosalvarsan intravenously three courses each totalling 3.9 mg with stovarsol by mouth in the intervals. The second case was very similar except that the disease started with coryza three years previously. Cure was effected by the same treatment.

The author states that fusiform bacilli are often associated and he discusses the question whether Castellani's bronchial spirochaetosis may or may not be due to aspiration from a Vincent's angina, but

in none of the cases observed up to the present has Vincent's angina been seen in these patients, and vice versa Vincent's angina though common in the district is not complicated by pulmonary lesions. The condition, he concludes, is by no means rare though it may be mistaken for tuberculosis the maintenance of general health, the presence of spirochaetes, absence of tubercle bacilli, and ready curability with arsenical preparations, make the distinction between the two easy.

H. Harold Scott

COON (P.) Broncho-spirochaetosis van Castellani in de Molukken. [Bronchospirochaetosis in the Moluccas.]—*Geneesk Tijdschr v Neder Indit* 1928. Vol 68 No 2 pp 293-296.

After the case described by SCHIJVRECHTURDEN in 1925 (see this *Bulletin* Vol. 23 p 116) no further cases were seen till 1927 when eight cases came to the author's notice between March and August. No certainty could be obtained as to where the infection was acquired, but reports from the interior of Ceram render it very probable that the disease is endemic in the Moluccas. It has generally a benign character and notwithstanding repeated lung bleedings the general condition of the patients remains good. The author's attempts to treat the disease with iodate of potash, arsphenamine or tartar emetic yielded only temporary results.

W. J. Bala

POLDOS (H.) Observations sur la spirochètose bronchiale. [Observations on Bronchial Spirochaetosis.]—*Bull Soc Path Exot* 1928. Oct. 10 Vol 21 No 8 pp 620-625 [Hadassah Med. Centre, Tiberias, Palestine.]

The description of a case of this disease in a Jew from Tiberias, Palestine followed by a general discussion of the subject. The author comes to the conclusion that bronchial spirochaetosis is a definite clinical syndrome probably caused by the invasion and multiplication of the spirochaetes from the mouth and pharynx in the trachea and bronchi. The infection develops only after the mucous membranes of the bronchial tubes have been rendered susceptible by another infection or by modifications of the tissues as a result of alterations in the circulation in the general metabolism or in local immunity.

R. H.

DE VELLO (Froilano) & FIALHO (António) Sur les spirochètes commensaux des arcades dentaires et de l'intestin de l'homme et de quelques animaux domestiques. [The Commensal Spirochaetes of the Human Teeth and Intestine, and of Some Domestic Animals.] — *Arquivos da Escola Méd.-Cirúrg de Nova Goa* 1928 Ser. A. No. 2 pp 69-85, 10 refs. [Bact. Inst. Nova Goa.]

The authors give statistics of the prevalence of mouth spirochaetes in Portuguese India. Persons infected with pyorrhoea alveolaris practically always show spirochaetes. An examination of normal mouths showed that the incidence increased with age: 20 per cent in children of 3-12 years, 56 per cent in young men of 12-21 years and in adults 80 per cent. The author has studied these organisms in Angola as well as India and gives the dimensions and indices of the four types of spirochaetes identified by him, viz. *S. buccalis*, *S. dentium*, *S. intermedia* and *S. buccalis* var. In India *S. buccalis* and *S. dentium* are very abundant but *S. intermedia* is rare and the fine variety of *S. buccalis* has never been found. In Angola, on the other hand, all four species are present.

The examination of the mouths of various animals showed the presence of similar types. The horse contained four types corresponding to those found in man and the pig three corresponding to *S. buccalis*, *S. dentium* and *S. intermedia*. Cattle showed only two types, *S. buccalis* and *dentium* but the dog like the horse contained four types. Rats, mice, goats and sheep were examined with negative results.

With regard to the spirochaetes of the human intestine four types have been observed, *S. macfiei*, *S. concerni*, *S. curvyrata* and *S. intestinalis*. The latter species is considered to be probably the same as *S. intermedia* of the mouth. An examination of a number of normal persons and others suffering from various intestinal diseases leaves no doubt that these spirochaetes are harmless commensals, of no pathological significance.

Spirochaetes of the type *curvyrata* were found in the intestines of the following animals: horse, mule, sheep, pig, cattle, dog, goat, rabbit, guinea-pig and cat. The mouse contained two types, one resembling *curvyrata* and in one example of *Mus rattus* a very small fine spirochaete was observed.

E. H.

- i. FUKUSHIMA (Banji) Ueber die Nährböden für die Spirochaeten. Ueber die Entwicklung von *Spirochaeta sclerochaemorrhagiae* und ähnlichen Spirochaeten, sowie ueber das Optimum der Wasserstoff ionenkonzentration für Dieselben. II. Mitteilung. [Culture Media for Spirochaetes. The Development of *Sp. sclerochaemorrhagiae* and Similar Spirochaetes, also the Optimum Hydrogen Ion Concentration for their Growth. Part 2.—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo 1927 Vol. 6. pp 533-544.]
- ii. — Ueber Kulturverfahren der *Spirochaeta sclerochaemorrhagiae* und ähnlicher Spirochaeten. III. Mitteilung. [Methods of cultivating *Sp. sclerochaemorrhagiae* and Related Spirochaetes. Part 3.—*Ibid.* pp 545-554. With 1 plate. [28 refs.]]

1. The first paper contains the results of altering the pH concentration in a culture medium consisting of 500 cc. distilled water mixed with

ii. In the second paper the author recommends the two following media for the culture of *Leptospira*

(1)	Citric acid	0 1
	Calcium chlorate	0 1
	Sodium hydrate	5 5
	Tap water	100.0 cc.

This mixture is sterilized for one hour at 100 C. 0.3 gm saccharose is then dissolved in a little distilled water heated for 10 minutes to 100 C and added to the above solution. 80 cc. of the resulting medium are then mixed with 20 cc of inactivated horse serum the resulting pH being 7.4 to 7.6 the mixture is then run into test tubes 10 cc in each

(2)	Citric acid	0 1
	Calcium chloride	0 1
	Sodium hydrate	5 5
	Glucose	0 2
	Tap water	100.0 cc

After sterilization for one hour at 100 C., 80 cc. of this solution are mixed with 20 cc. of inactivated horse serum and divided into test tubes as in the case of the first medium.

The tubes containing the media are heated for one hour at 56 C and then one drop of infected guineapig blood is added to each tube they are then incubated at 37 C for 48 hours. For making subcultures one drop of normal guineapig blood is added to each tube and then 0.1 cc of the culture. For making plate cultures the first medium is used but 75 cc. of the mixture is mixed with 25 cc of horse serum. After heating to 56 C for one hour one drop of normal guineapig blood is added to each tube and these left for 24 hours for the fibrin to precipitate. The clear supernatant fluid is then poured on to agar plates (without bouillon or peptone) in the proportion of about 1 to 5. The culture of spirochaetes, preferably after two or three passages is then sown on the surface of the plate which is then grown for 4 days at 37 C and afterwards at 30 C.

E H

JAKIMOW (W Ph) Zur Methodik der Rieckenberg-Brussinschen Reaktion. [The Technique of the Rieckenberg-Brussin Reaction.] —*Ztschr f Immunitätsf u Experim Therap* 1928 Vol. 58 No 5/6 pp 413-422. [5 refs.] [People's Commissariat (A.T.S.S.R.) for Hygiene, & State Univ. Kasan.]

An account of the method of using this reaction for the identification of strains of relapsing fever. The author gives the following details. In order to strengthen the adhesive action of the immune bodies it is necessary to add a drop of the citrated blood of a normal animal. The immunization of rats and rabbits with killed cultures of *S recurrentis* results in the formation of an immune serum capable of producing the adhesion phenomenon, in the same way as serum from animals that have recovered from an infection. The immune plasma and serum from an animal infected with a relapse strain contains immune bodies not only against that strain but also against the original strain. The thrombocyto-barron on which this reaction depends can be produced by the passive immunization of normal animals.

E H

REGENDANZ (P). Ueber die Bedeutung der Milz bei der Spirochäteninfektion. [The Significance of the Spleen in Spirochaetal Infections.]—*Cent J Bakt I Abt Orig* 1928 Vol 7 Vol 108 No 5/6 pp 321-327 22 refs Inst for Ship & Trop. Diseases, Hamburg.]

Working with *S. didelphidis* a spirochaete of a South American opossum, the author has investigated the effects of splenectomy. His results support the generally accepted views as to the protective value of the spleen, for out of 8 normal opossums infected with spirochaetosis only 3 died, after 12 and 15 days respectively whilst 8 splenectomized animals, similarly infected, all died within 7 to 15 days and also showed heavier infections. In addition those animals infected with *Haemogregarina didelphidis* showed an increase in the multiplication of these parasites.

E. H.

JAUSIOX (H). Les spirochetoses Généralités et spirochètoses ectomésodermiques (Spirochaetoses, Generalities and Ecto-Mesodermic Spirochaetoses).—*Paris Mèd* 1928 Oct 13 Vol 18 No 41 pp 301-303

A general account of spirochaetosis with special reference to those infections transmitted by contagion syphilis excepted.

E. H.

DELOUME (M) & ANDERSON (T. F.) Réveil de l'infection à *Spirochaeta duttoni* déterminé chez la souris blanche par inoculation de *Trypanosoma brucei* Infection mixte trypano-spirochétienne. [Reactivation of *S. duttoni* Infection, produced in White Mice by Inoculation with *T. brucei* Mixed Infection of Trypanosomes and Spirochaetes.—*C. R. Soc Biol* 1928 May 4 Vol 98, No 14 pp 1183-1185 4 refs Pasteur Inst Paris.]

In mice that had apparently recovered from infection with *Spirochaeta duttoni* the inoculation of *Trypanosoma brucei* about two months after the first infection was followed by the reappearance of spirochaetes in the blood, along with the trypanosomes. By means of various tests these spirochaetes were shown to be identical with the Brazzaville strain of *S. duttoni* used for the original infection.

E. H.

GALLIARD (H). Guérison spontanée de l'infection mixte à *Trypanosoma brucei* et *Treponema crociduræ* chez la souris blanche [Spontaneous Recovery from a Mixed Infection of *Trypanosoma brucei* and *Treponema crociduræ* in the White Mouse].—*Bull. Soc Path Exot* 1928 Apr 18, Vol 21 No. 4 pp 315-316

It is well-known that animals with mixed infections of trypanosomes and spirochaetes tend to suffer from a chronic infection. The author has found that mice inoculated with a mixed infection of *Trypanosoma brucei* and *Spirochaeta crociduræ* may sometimes completely recover. In two such cases the trypanosomes were present in the blood only

for three days and spirochaetes for twelve days. The animals both had spirochaetal relapses after which their blood became negative and no signs of either infection could subsequently be found

E H

SAZERAC (R.) & VAURS (R.) Action de l'arsenic, en tant que corps simple sur les spirochètes et les trypanosomes. [The Action of Free Arsenic on Spirochaetes and Trypanosomes.]—*C R Soc Biol* 1928 July 6 Vol. 99 No. 23 pp. 372-373 [2 refs.] (Pasteur Inst. Paris.)

In view of the favourable results obtained by the use of metallic mercury or bismuth for the treatment of syphilis the authors tested the action of free arsenic in the uncombined state obtained by the precipitation of arsenious acid by sodium hypophosphite. The arsenic was found to have a slight curative effect on rabbits infected with *Spirochaeta cuniculi* and rats infected with *Trypanosoma brucei* but its action was much inferior to that of bismuth and therefore it is unlikely to be of use for the treatment of these types of infection.

E H

ARISTOWSKY (W. M.) & SCHAECHTER (E. P.) Beobachtungen an der Rickenberg Brunsinschen Reaktion beim Rückfallfieber des Menschen [Notes on the Rickenberg-Brunsin Reaction in Human Relapsing Fever]—*Ztschr f. Immunitätsf u. Experim. Therap.* 1928 Aug. 8 Vol. 57 No. 3/4 pp. 347-356 [Health Commissariat Tartar Rep. & State Univ. Kazan.]

This reaction was obtained with the serum of a human patient inoculated with a culture of *S. recurrentis*. The blood was collected on the day following the fall in temperature. For the reaction to succeed it is necessary to use the plasma containing blood platelets of a healthy animal e.g. rat guinea pig or rabbit but not human blood. A positive reaction was obtained when the infected serum was diluted more than 1 000 times. The author's observations with this reaction support the view that in spirochaetal infection, antibodies and lysins are identical.

E H

LINS (Abdon) Révision des spirochètes [A Revision of the Spirochaetes.]—*Rev. Med.-Cirurg. do Brasil* 1928 July Vol. 36. No. 7 pp. 293-306.

The author recognizes only five genera of spirochaetes *Spirochaeta*, *Treponema*, *Cristispira*, *Saprospira* and *Leptospira* and gives a list of about 200 spirochaetes arranged according to their source. The author's list of valid species is somewhat unfortunate as he commences with *Leptospira icteroides* the agent of yellow fever.

Leptospira morsus muris the agent of Sodoku. *L. gallica* the agent of trench fever. *L. cornyi* found in cases of dengue etc. etc.

E. H.

ROGE (Heinrich). Das Ausmessen von Spirochäten. [The Measurement of Spirochaetes.]—*Arch. f. Schiff- u. Trop. Hyg.* 1928. July. Vol. 32. No. 7. pp. 378-380. With 4 text figs. [Inst. for Ship & Trop. Diseases, Hamburg.]

The author has compared the methods of measuring spirochaetes using four strains of relapsing fever. The results show that relapsing fever spirochaetes cannot be distinguished with any certainty by their dimensions alone and the complicated schemes of measurement devised by DELAMARE and by FROILANO DE MELLO are from this point of view of little value.

E. H.

SARRAZIN (J.). A propos de la chromophobie comparée des spirochètes et de leurs divers modes de coloration à l'aide de la fuchsine de Ziehl. [The Comparative Staining Properties of Spirochaetes and their Coloration by Ziehl's Fuchsin.]—*C. R. Soc. Biol.* 1928. May 18. Vol. 88. No. 15. pp. 1275-1278. 9 refs.]

The author recommends fixation by heat followed by Ziehl's stain for the coloration of spirochaetes except in the case of cultures containing albuminous material, when it is advisable to use the Fontana-Tribondeau method before staining [see this *Bulletin* Vol. 25 p. 612].

E. H.

GELOMKE (G.). Di uno strano reperto in alcune spirochetosi. [A Peculiar Structure found in some Spirochaetes.]—*Ann. d. Med. Nov. e Colon.* 1928. July-Aug. Year 34. Vol. 2. No. 1-2. pp. 64-68. With 1 plate.

The author when examining smears from local spirochaetal lesions, noticed thickened spirillar or club-shaped terminations to some of the organisms. They resemble the vibriothrix described by CASTELLANI. He considers the question whether they are degenerative forms of treponemata or new organisms, and appears to incline to the former explanation. A microphotograph shows the structures very clearly.

H. Harold Scott

LEDER (Marcel). As Spirochaetoses humanas.—*Rev. Med. Cirurg. do Brasil.* 1928. Aug. Vol. 36. No. 8. pp. 323-344.

NICOLLE (Ch.) MARTIN (C.) & ANDERSON (Ch.). Sur l'existence des spirochètes récurrents du groupe Dutton.—*C. R. Acad. Sci.* 1928. Oct. 15. Vol. 187. No. 16. pp. 631-632.

LEPTOSPIROSES

ANJOW (Saburo) Vergleichende Untersuchungen über die Widerstandsfähigkeit verschiedener Leptospiren (Spirochäten) gegen äussere Einflüsse [A Comparative Study of the Resistance of Various Leptospirae to External Agents.]—*Cent f Bakt I Abt* Orig 1928. Oct 26 Vol 109 No 1/4 pp 61-80 [29 refs.] [Med. Clinic, Imperial Univ Tokyo]

The author has compared the effects of various agents on nine strains of pathogenic *Leptospira* and two of the water forms. When cultured in the presence of various metals iron lead, mercury and copper the water strains were unaffected, but the others showed varying degrees of resistance. Copper was the most toxic metal in its presence all the cultures, with one exception being negative after three days. Mercury came next and with the exception of two Akiyami strains all the cultures were negative after three to seven days. Lead was toxic to cultures of *L. icterohaemorrhagiae* and *L. icteroides* and one strain of Akiyami B and this same strain was killed by iron which had little effect on any other forms. The metals were also added to well-developed cultures as well as those just sown and similar results obtained. Electro-collargol in dilutions of 1 in 100 was toxic to all cultures except *L. hebdomadis* and electro-selenium in dilutions of 1 in 250 killed all cultures except Akiyami B in both cases the water strains were unaffected. When cultures were kept in various dilutions of serum the latter were much more resistant than the pathogenic forms. An increase in the concentration of the salt in the culture media to 1.4 per cent was fatal to all except an Akiyami B and the water strains. This Akiyami strain was only slightly affected when the concentration was increased to 1.5 per cent which was fatal to both the water strains. Bile salts also gave similar results. Saponin had no appreciable effect on the spirochaetes, but acid in the dilutions of 0.1 to 0.2 per cent killed all the forms examined within a few minutes. All the strains would live at temperatures from 10° to 37° C but rapidly died at 42° C. When cultured in the presence of various other bacteria such as *Bact coli communis* *Bact coli haemolyticus* streptococci typhoid and paratyphoid, varying degrees of resistance were demonstrated. Summarizing the results it is seen that the various strains of *L. icterohaemorrhagiae* including *L. icteroides* form one group *L. hebdomadis* *L. febrilis* and Akiyami types A and B another group and the water strains a third more resistant group. It should be noted that *L. febrilis* in its serological properties seems to approach the typical *L. icterohaemorrhagiae* but in resistance more closely resembles *L. hebdomadis*.

E. Hindle

STÉFANOPOULO (G. J.) & HOSOYA (S.) Sur les spirochétidés agents de la fièvre d'automne du Japon. (*Spirochaeta autumnalis* types A et B) [The Spirochaetes of Japanese Autumnal Fever (*S. autumnalis* Types A & B)]—*C R Soc Biol* 1928. May 18 Vol 98 No 15 pp. 1317-1320 [1 ref.]

The authors have studied these two strains of spirochaetes and obtained interesting results on their nature.

S. antimalis type A was found to produce jaundice in guinea-pigs in the same way as *L. icterohaemorrhagiae* but the haemorrhages were always more abundant with the former infection. Moreover haematophagy and neutrophagy were observed in the spleen. The disease is difficult to reproduce in rabbits but one success out of six was obtained by the intratesticular inoculation of 2 cc. of a very virulent culture. The rabbit died six days after inoculation and spirochaetes were found in the heart blood.

When the strain was first tested against the serum of 13 convalescents from spirochaetal jaundice, only one of them produced any agglutination of *S. antimalis* type A. After being kept in the laboratory for eight months the strain was much more often agglutinated by such sera, but always to a less degree than *L. icterohaemorrhagiae*. Thus a horse anti-serum agglutinated *S. antimalis* A in dilutions of 1 in 1 000 and *L. icterohaemorrhagiae* diluted 1 in 50 000. Conversely a rabbit anti-*antimalis* A serum, agglutinated the homologous organism in dilutions of 1 in 500 but *L. icterohaemorrhagiae* required 1 in 100. Both these sera had no agglutination effect on *S. antimalis* B and *S. hebdomadis*. Using Pfeiffer's reaction, the two types of *antimalis* and *L. icterohaemorrhagiae* could be clearly distinguished, but nevertheless type A and the latter strain were shown to be related and preservation in the laboratory has made this relationship more evident.

S. antimalis B. This organism produces only a mild infection in guinea-pigs. Serological studies showed that the strain is absolutely identical with *S. hebdomadis*.

[The work of BAERMANN ZUELLER and others suggests that all leptospira are closely related, and under laboratory conditions tend to become a single type. The above results partly confirm this view but also show that in the cases examined there are distinct serological differences when the strains are recently isolated.]

E. H.

SHIOZAWA (Solchi). Immunologische Beziehung zwischen verschiedenen Leptospiren [The Immunological Relationships of Various Leptospira].—Cent. J. Bakt. L. Abt. Orig. 1928. Oct. 28. Vol. 109 No. 1/4 pp. 80-83. [25 refs.] [Med. Clinic Imperial Univ. Tokyo.]

SHIOZAWA (Solchi). On the Immunological Specificity of Leptospira Species.—J. J. Shimbun (Med. News) 1927. Oct. No. 1221. [Summarized in J. Pan. Med. World 1928. Feb. 15. Vol. 8. No. 2. p. 39.]

The author has studied the serological reactions of various strains of Leptospira and gives the results of agglutination experiments, culture in the presence of immune sera, Pfeiffer's reaction etc. and also of various infection experiments. The results are given in tabular form and support the view that *L. hebdomadis* and the related Akivami types A and B are distinct from *L. icterohaemorrhagiae*. *L. icteroides* is found to be identical with the latter and *S. febrilis* is also closely related to it. The two water strains studied were found to be very distinct from the pathogenic forms in their serological properties.

E. H.

GARDNER (Gerard) Agglutination du *Spirochaeta pseudo-icterohaemorrhagiae* (souche aquicole de Vincent) au cours des cultures successives. [The Agglutination of *Sp pseudo-icterohaemorrhagiae* (Vincent's Water Strain) in Successive Cultures.]—*Bull Acad Méd* 1928, Oct. 9 Year 92, 3rd Ser Vol 100 No 33 pp 961-963 [5 refs]

A comparison of a strain of *L. icterohaemorrhagiae* isolated from a case of Weil's disease in 1916 and subsequently maintained in cultures and Vincent's water strain which was isolated in 1926. The results show that sera which strongly agglutinate the former strain also agglutinate the water spirochaete whereas in 1927 MICHAHOFF found that the two were quite distinct. Although the author was unable to infect guinea-pigs with the water strain his results suggest that after prolonged culture this organism is approaching the typical pathogenic form in its serological properties.

E H

SANARELLI (G.) Sur la pathogénie des spirochétoses ictérogènes. [On the Pathogenicity of Icterogenic Spirochaetoses.]—*Bull Acad Méd* 1928, Oct. 30 Year 92, 3rd Ser Vol 100 No 36 pp. 1066-1070

During an attempt to enhance the virulence of a spirochaete by passage through guinea-pigs the author noticed that the infected animals frequently showed secondary invasion with other bacteria specially streptococci, and paratyphoid bacilli. Moreover in cases of infectious jaundice in human beings the latter organism is frequently present in the blood. Consequently the author in conjunction with Dr PERGHER tested three strains of *Leptospira* in different species of animals in order to discover the exact mechanism in the production of jaundice. The strains employed were *Leptospira icteroides*, *L. icterohaemorrhagiae* and *L. autumnalis*. The results seem to indicate that these organisms in themselves do not produce very fatal toxins but in all cases when there was a cessation of febrile symptoms (often accompanied by jaundice followed by the death of the animal) one could cultivate various bacteria from the blood and organs even in the absence of spirochaetes. The results of pathological examination suggest that these secondary organisms in themselves are able to produce the characteristic symptoms but rarely so severely as to cause death.

These organisms invade the animal after the sudden fall in temperature and are found to be fairly constant for each species. Thus guinea-pigs are usually invaded by streptococci more rarely by paratyphoid bacilli rabbits are generally infected by coli bacilli young dogs by a variety of organisms streptococci, coli bacilli, staphylococci, paratyphoid bacilli, etc. and human beings generally show the presence of paratyphoid bacilli. These invasions are not due to a diminution in the bactericidal properties of the blood but are a result of the destruction of the liver and spleen tissue by the direct action of the spirochaetes.

According to the author it is possible to reproduce artificially the pathological appearances of fatal spirochaetosis by inoculating an animal intraperitoneally with a mixture of fresh blood and the bacteria generally found after death, as indicated above. This inoculation

S. autumnalis type A was found to produce jaundice in guinea-pigs in the same way as *L. icterohaemorrhagiae* but the haemorrhages were always more abundant with the former infection. Moreover haematophagy and neutrophagy were observed in the spleen. The disease is difficult to reproduce in rabbits, but one success out of six was obtained by the intratesticular inoculation of 2 cc. of a very virulent culture. The rabbit died six days after inoculation and spirochaetes were found in the heart blood.

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E. H.

SHIOZAWA (Sotchi). Immunologische Beziehung zwischen verschiedenen Leptospiren. [The Immunological Relationships of Various Leptospira. — *Cent. J. Bakt. L. Abt. Orig.* 1928, Oct. 28, Vol. 109 No 1/4 pp. 80-93. [25 refs.] [Med. Clinic, Imperial Univ. Tokyo]

SHIOZAWA (Sotchi). On the Immunological Specificity of Leptospira Species. — *Ipi Shimbun (Med. News)* 1927, Oct. No 1221 [Summarized in *Japan Med. World* 1928, Feb. 15, Vol. 8, No. 2, p. 39.]

The author has studied the serological reactions of various strains of Leptospira and gives the results of agglutination experiments, culture in the presence of immune sera Pfeiffer's reaction, etc. and also of various infection experiments. The results are given in tabular form and support the view that *L. hebdomadis* and the related Akiyama types A and B are distinct from *L. icterohaemorrhagiae*. *L. icteroides* is found to be identical with the latter and *S. febrilis* is also closely related to it. The two water strains studied were found to be very distinct from the pathogenic forms in their serological properties.

E. H.

of water spirochaetes prepared by Hindle's method. In this connexion the author remarks that although the growth of saprophytic spirochaetes is favoured by this method it is possible that any pathogenic leptospiras present in the original water sample might be destroyed by the growth of saprophytic bacteria and the consequent fouling of the water.

The best method of isolating the leptospiras from contaminating bacteria was found to be centrifugation. A speed of 3 000 revolutions per minute continued for one hour was found to bring down all bacteria whilst leptospira could still be found in the supernatant fluid. Consequently pure cultures can be obtained by this method with much greater ease than by the use of filtration.

E. H.

BESSEMANS (A.) & NÉLIS (P.) Sur la fixation du complément dans la spirochétose ictérohémmorragique [Fixation of Complement in Spirochaetosis icterohaemorrhagica].—*C. R. Soc. Biol.* 1928 May 4 Vol 98. No 14 pp 1234-1236. [10 refs.] [Inst of Hyg & Bact. Univ. Ghent.]

The sera of 13 syphilitic patients which all gave a strongly positive Wassermann reaction gave negative results when tested for fixation of complement using *Leptospira* cultures as antigen. Similar negative results were obtained when aqueous extracts of normal and infected livers were employed except in one case when a positive reaction was obtained with the normal liver extract and none with the infected one. Eight of these sera were tested against alcoholic extracts and two were negative but the other 6 gave strong fixation of the complement with both normal and infected livers. The sera of 12 normal persons were similarly tested and all were negative except two which gave positive reactions with both livers. The sera of 4 cases of spirochaetal jaundice which all gave a negative Wassermann reaction showed marked fixation of complement when tested against alcoholic extracts of both normal and infected livers and also in three cases with cultures of *Leptospira*. Positive results were also obtained with the sera of a rabbit and a dog vaccinated against this infection. Five guinea-pigs and another rabbit similarly vaccinated gave negative results as well as ten controls.

These results do not confirm previous statements to the effect that patients infected with spirochaetal jaundice often give a positive Wassermann reaction. Moreover the positive results obtained by MARTIN and PETTIT with syphilitic serum employing as antigen the liver of a guinea-pig containing numerous leptospiras, might be explained as due to a Wassermann reaction instead of a Bordet-Gengou test.

E. H.

TOHYAMA (Yuzo) Result of the Prophylaxis of Weil's Disease (*Spirochaetosis icterohaemorrhagica*) experimented in Kagoshima Prefecture.—*Scientific Reports Govt Inst Infect. Dis. Tokyo.* 1927 Vol. 6. pp 555-557

The author finds that the *Leptospira* of Weil's disease thrives in the water of the paddy fields and therefore tested various kinds of

fertilizers to see which killed the spirochaetes most readily. Calcium cyanamide was found to be the most satisfactory remedy and as it is also an excellent fertilizer it was tested in some heavily infected rice fields. The year before the experiment there were 30 cases of Weil's disease amongst the workers in these fields, but after calcium cyanamide had been used only two cases occurred in the following season, although all the surrounding fields had large numbers of workers who became infected. In addition the rice crops in the experimental fields were very much higher than in other regions one farm producing a crop more than 60 per cent higher than the average for the province.

E. H.

SAZERAL (R.) & NAKAMURA (H.) Sur le mécanisme de l'action préventive du bismuth contre la spirochétose ictéro-hémorragique. [The Mechanism of the Protective Effects of Bismuth against *Spirochaetomorrhagiae*.—*C. R. Acad. Sci.* 1928, July 17, Vol. 187, No. 3, pp. 181-182. 2 refs.]

25 guinea-pigs were each injected subcutaneously with 0.01 gm. of sodium tartro-bismuthate per 100 gm. body weight. These were divided into five lots and each lot of five animals inoculated with *Leptospira icterohaemorrhagiae* after intervals of 15, 23, 32 and 45 days respectively. All the animals up to those inoculated 32 days after the bismuth injection remained healthy whilst those inoculated after 45 days interval succumbed to the infection. Three animals inoculated simultaneously with a mixture of the bismuth compound and a virulent culture remained uninfected after three months.

E. H.

TIXIER (Léon) & DE SEÏF (Stanislas) Ictère spirochétosique professionnel d'origine fluviale avec double recrudescence fébrile. Étude comparative des trois courbes thermique urinaire et uréique. Occupational Spirochaetal Jaundice of Aquatic Origin, with Two Febrile Relapses. A Comparative Study of Three Curves, Thermal, Urinary and Urea Salts.—*Bull. d. Mém. Soc. Méd. Hôpit. de Paris* 1928, July 28, Year 44, 3rd Ser. Vol. 52, No. 28, pp. 1336-1340. 8 refs.

The description of a case of Weil's disease in a dredger who almost certainly acquired the infection from the mud in which he was working. A second case was also observed from the same locality. The symptoms are described in detail and particulars are given of the results of analysis for urine salts. The patient entered hospital with a raised azotaemia (3 gms.) and scanty urine (1 litre) and was without fever. The azotaemia rapidly fell to 0.44 gm. accompanied by diuresis (2.5 l.). Then occurred the first febrile recrudescence. This was followed by renewed azotaemia (0.75 gm.) and scanty urine (1 l.). The temperature then fell to 37° C. When he finally recovered the urine salts fell to normal (0.27 gm.) and a second urinary crisis (3 l.) occurred. A third febrile recrudescence was followed by recovery.

E. H.

DE LAVERGNE (V) D'une forme chirurgicale de la spirochétose ictéro-hémorragique. [A Surgical Form of Weil's Disease.]—*Bull et Mém Soc. Méd Hôpit de Paris* 1928. Nov 15 Year 44 3rd Ser Vol. 52. No 30 pp. 1498-1502. '7 refs.]

A patient fell into some mud at the bottom of a ditch and received cuts and bruises on his head and hands. Sixteen days later he developed an attack of spirochaetal jaundice. The diagnosis was made on the 25th day from the result of a serological reaction

E. H

URTUBEY (L.) Un caso de leptospirosis icterohemorrágica [A Case of Weil's Disease.]—*Med Paises Calidos* Madrid 1928 Sept Vol 1 No 5 pp 446-450 With 1 fig French summary p 450

The author records a case of this disease in Cadiz

E. H

RUGE (Heinrich) Neuere Literatur ueber Weilsche Krankheit und Siebentagefieber [Recent Publications on Weil's Disease and Seven Day Fever]—*Arch f Schiffs u Trop Hyg* 1928 Aug Vol 32. No 8 pp 412-432. With 1 text fig [Numerous refs] [Inst. for Ship & Trop Diseases Hamburg]

A useful summary of recent work

E. H

TURKHUDD (D. A.) A Note on Weil's Disease or Leptospirosis Icterohaemorrhagica.—*Indian Med Gaz* 1928. Oct. Vol. 63 No 10 pp 583-588. With 4 charts in text

RAT BITE FEVER.

SCHOCKAERT (J) Contribution à l'étude de sodoku. [Contributions to the Study of Sodoku]—*Arch Internat Méd Expér* Liège 1928. May Vol. 4 No 1 pp 133-227 With 8 text figs. [94 refs.] [Bact. Inst Univ Louvain.]

A detailed study of this disease with a useful summary of previous observations. The first part is devoted to a consideration of the disease itself mainly from a clinical aspect and in this is included an account of six cases experimentally infected with sodoku. These six patients showed varied symptoms but none of them agreed with the usual clinical manifestations of the disease. Two strains of the spirillum were employed and the symptoms of the six cases are summarized in the following table —

Case.	Strain	Maximum temperature	Local reaction.	Exanthem	Immunity in vitro	
					Paris	Louvain
1	Paris (human)	103.8	+++			
2		104.0	+++	++	+++	+++
3		104.0	+++	++	+++	+++
4		100.6	++		++	++
5	Louvain (mouse)	100.4	+			+
6		101.6	++		+	+++

- YAMAMURA (Sohji) [On the Serum Diagnosis of Rat Bite Fever.]—*Akron Denzshigakkaui Zasshi (Jl Infect Dis)* 1928. Feb. Vol. 2. No 5 [Summarized in *Japan Med World*. 1928. July 15 Vol. 8. No 7 p 191]

The author has succeeded in obtaining a complement fixation test for rat bite fever. As antigen he employed an alcoholic extract of a [presumably infected] guinea-pig's heart, 1 gm. in 5 cc. of alcohol. This was diluted with three times its volume of alcohol and to each 5 cc. of the resulting liquid was added 0.3 cc. of a 1 per cent. alcoholic extract of cholesterol. The preparation was again diluted with six times its volume of saline solution. The test was tried on four cases which all gave positive results.

E. H.

- SCHLOSSBERGER (H.) Chemotherapeutische Versuche bei der Rattenbissinfektion der weissen Maus. [Chemotherapeutic Trials in Rat Bite Fever of the White Mouse.]—*Ztschr f Hyg u Infektionskrankh* 1928. July 3 Vol. 103. No. 4 pp. 627-636. [Numerous refs.] [State Inst. for Experim. Therap. Frankfurt a.M.]

Details are given of the results obtained with a variety of compounds in the treatment of mice infected with *Spirillum minus*. The following were found to have no effect on the infection: trypanflavin, trypanosan, colloidal iodine, silver methylene blue, collargol, tartar emetic, calomel, triphenyl bismuth, sanocrysin, krysalgan, sodium chaulmoograte, quinine hydrochloride, optochin hydrochloride, emetin hydrochloride, Bayer 205, stibenvil, stibosan, antimosan. Preparation 2952, Albert 188, silver salvarsan, and neosalvarsan in 10 per cent. milk sugar solution.

Complete sterilization of the mice was only obtained by the use of the following organic arsenical compounds: Stovarsol, sulphonyl salvarsan, neosalvarsan, and neosalvarsalvarsan.

E. H.

- STEWART (R. Cameron) A Case of Rat Bite Fever.—*Canadian Med Assoc J* 1928. Nov. Vol. 19. No. 5 pp. 575-577. With 1 chart in text.

A general account of the disease followed by a description of a case in a Montreal infant seven months old, who was bitten by a rat. Although spirochaetae were not observed there is little doubt as to the diagnosis, and the baby was given an intramuscular injection of 70 mgm. sulpharyphenamide at the height of a febrile attack. The temperature afterwards remained practically normal and all symptoms disappeared, but a second injection of 105 mgm. of the drug was given eight days later as a precautionary measure. The hospital records seem to show that sodoku is a comparatively rare disease in Canada.

E. H.

- DA SILVA (Ribeiro). Um caso de "sodoku" em S. João d'El-Rey [A Case of Rat Bite Fever in S. João d'El-Rey (Rio de Janeiro).]—*Brasil Medico*. 1928. Sept. 29. Vol. 42. No. 39. pp. 1062-1093.

The author affirms that cases of rat bite fever in the South American states are sufficiently rare to warrant him in recording this.

A man 36 years of age was badly bitten on the right thumb by a large rat. The wound was treated immediately with Tinct iod. Ten days later he had a rigor the wound became red and painful lymphangitis and axillary lymphadenitis supervened and a papular erythematous rash appeared over the chest back and front. There was severe pain in the left hip and a sensation as if his tongue was much swollen (this was not the case). The fever recurred periodically every 10-12 days with afebrile intervals of 4-6 days the attacks terminating with profuse sweats. He was treated with neosalvarsan in doses of 30-40 cgm and the illness lasted for two months.

H Harold Scott

CLEARKIN (P. A.) **A Case of Rat Bite Fever contracted in the Laboratory**
—*Kenya & East African Med J* 1928 Sept Vol 5 No 6
196-200 With 1 chart

A laboratory attendant in Tanganyika was bitten by a black rat and seven days later developed a typical attack of rat bite fever which required three injections of N.A.B. before it was cured.

This is the first record of the disease from Tanganyika but in view of the fact that natives are often bitten by rats the author considers it possible that some of the refractory ulcers of the extremities may be due to this infection.

E H

KNOWLES (R.) & GUPTA (B. M. Das) **Rat Bite Fever as an Indian Disease.**—*Indian Med Gaz.* 1928 Sept. Vol 63 No. 9
pp. 493-512. With 1 text fig. 13 charts & 2 coloured plates.
[44 refs.]

During the last five years the authors have observed 30 to 35 cases of this disease and in the present article give details of 28 cases. The disease would seem therefore, to be fairly common in India. The best methods of laboratory diagnosis were found to be direct examination of the serous exudate from the local lesion and inoculation of the patient's blood into white mice and guinea-pigs. The latter method succeeded in 23 out of 26 cases. The blood of 23 rats (*Rattus norvegicus*) in Calcutta city was examined by dark ground illumination and spirilla were found in five of them.

E. H.

AMOEBIASIS AND DYSENTERY

AMOEBIASIS.

REMLINGER (P) La dysenterie amibienne au Maroc et en particulier à Fes. [*Amoebic Dysentery in Morocco and Especially Fes.*]—*Rev d'Hyg et de Méd. Préventive* 1928. Sept. Vol. 50 No 9 pp 641-656. [Refs. in footnotes]

The author reviews in some detail the records of amoebic dysentery in Morocco and more particularly in Fes—a country and a town with a great and evil reputation, thoroughly justified, for dysentery. Not only is the disease common among residents, but travellers from Morocco frequently suffer from dysentery after their return to France and not only dysentery but from ailments due to invasion of other organs by the amoebae—for a great proportion of the dysentery of Morocco is held to be amoebic. As to sanitation in that country things to-day are as they always were—bad. The author sounds a note of warning that the dysenteric amoeba of Morocco may yet find a more favourable new home in the south and west of France than proved to be the case in the north and east during the war.

[In India, Irak, Palestine and Egypt it is slowly becoming known that bacillary not amoebic, is by far the more common dysentery Morocco's turn will come.]

H. M. Hanschell.

YOANKOVITCH (G) La dysenterie amibienne dans la Serbie du Sud. [*Amoebic Dysentery in Southern Serbia.*]—*Bull. Office Internat d'Hyg. Publique* 1928. July Vol. 20 No 7 p 1061

During the war 1914-1918 E. IVANITCH demonstrated several cases of amoebic dysentery among the Serbian troops on the Monastir front, and after the war RANKOV discovered several cases among the inhabitants of Monastir. CASTELLANI found cases, during the war at Skoplje where in 1927 T. SIMITCH discovered two imported and two autochthonous cases. Among those attending school in Skoplje he has found 2 per cent. carriers of four nucleated cysts, some, he is convinced true cysts of *Entamoeba histolytica*. The cases of amoebic dysentery have been successfully treated by yatren 105 *per os*. They were practically cured in eight days.

H. M. H.

JAMES (William M.) Some Observations on Intestinal Amoebiasis due to Infection with *Entamoeba histolytica*.—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company Boston Mass* 1927 pp 185-200. With 10 figs. also in *Ann. Intern. Med.* Ann Arbor 1928. Aug. Vol. 2. No 2. pp 171-176.

— Human Amoebiasis due to Infection with *Entamoeba histolytica*.—*Ann. Trop. Med. & Parasit.* 1928. Aug 28 Vol. 22. No 2 pp 201-258. With 17 plates. [30 refs.]

In these two papers the author covers the same ground. In the *Annals of Tropical Medicine & Parasitology* he has dealt most fully with the subject and illustrated a careful and very interesting thesis with excellent plates displaying clearly the pathological histology of

amoebiasis of the gut the liver and the skin. It is difficult in a summary to do justice to this full paper from one whose long experience of the disease in Central America, exacting standard of diagnostic accuracy and habit of critical sane analysis of many tested observations in pathology and therapy have given him every claim to authority. From 1911 to 1914 the author with DEEKS had worked mostly on cases with histories of amoebic dysentery. But during that period routine examination of stools of patients admitted to Ancon Hospital for other causes often revealed small cystic and precystic entamoebae indistinguishable from cyst forming and end stages of the *histolytica* associated with dysentery. Many of these cases had had diarrhoea, and gastro-intestinal discomfort at times but no dysentery. At the same time H. C. CLARK demonstrated at autopsy active amoebic ulceration mostly in the caecum but often elsewhere in the large gut in patients dead from causes other than dysentery and in whom at time of death there was neither dysentery nor diarrhoea. There could be then considerable ulceration of the large gut without history of diarrhoea or dysentery. In retrospect the author realizes that the small pre-cystic and cyst forming *histolytica* had been often overlooked in routine stool examinations.

Since 1916 the author has personally examined stools from all his patients with gastro-intestinal disturbance of any kind and for the past three years has checked positive or doubtful findings with wet fixed permanent preparations. Soon he found that latent *histolytica* infections far exceeded those associated with dysentery at the time of examination. He is now convinced that in Central and Northern South America *histolytica* infection causes a very large proportion of obscure gastro-intestinal trouble not manifested by diarrhoea or dysentery as the cardinal symptoms. Of the five species of amoeba in man, there is no positive proof that four are in the least degree pathogenic. They are important in medical practice only because the fifth—*E. histolytica*—may be confused with any or all of them. Since 1916 important surveys by expert workers have been undertaken to determine not only how much *histolytica* infestation occurs in persons suspected of having acquired it previously but also the extent to which the general population is infested. The author reviews these surveys in England and North and South America and deduces from the data presented that where the survey has been conducted by competent observers the general population has shown an incidence of 5 to 10 per cent. of *histolytica* infestation in centres where amoebic dysentery itself is not endemic, and a higher percentage in endemic centres.

The author's own experience has shown him that vegetative forms of *histolytica* excluding dysentery cases are not accompanied by cysts in 50 per cent of positive cases. If this is true of temperate climes, then the 5 to 10 per cent incidence (founded on cyst findings) should be doubled. A parasite infesting 5 to 20 per cent. of the general population deserves interest. The clinical symptoms due to the grave lesions which the parasite may produce if at all common would not be missed at the bedside nor the lesions at autopsy in England and the U.S.A. where the surveys have been made. It would therefore be logical to infer that in temperate climes the pathogenicity of *histolytica* infection is in inverse proportion to its frequency and distribution that except at rare intervals it lives harmlessly in the gut lumen or else normally produces minute lesions in the colon mucosa which are healed almost as soon as formed. There is however no unanimity of opinion

the examination of fresh preparations and cultures in which protozoa were found. A higher percentage of stools in which parasites were found was obtained by the examination of fresh preparations after the administration of Epsom salts than by any other method. Present cultural methods did not prove suitable for routine examination of stools for intestinal protozoa. The combination of fresh preparations following the taking of Epsom salts and stained slides was the best routine method. The authors record that sometimes amoebae found in the fresh preparation were incorrectly identified—correct identification came on examining the stained preparation.

H M H

SCUDERI (Giovanni) Su di un caso epatite amebica colloquata con reazione pericardica e successiva apertura nella pleura e nel pericardio [*Amoebic Abscess of the Liver with Extension into the Pericardium and the Pleural Cavity*].—*Riforma Med.* 1928. June 4 Vol. 44 No. 23 pp 683-684 10 refs. (Inst. of Path. & Clin. Med., Univ. Messina.)

A man 40 years old, had suffered for the last two years of his life from epigastric pain believed to be due to gastric or duodenal ulcer. He developed right-sided empyema. 2 litres of turbid fluid being removed ten days, and another 1,200 cc. of pus eight days, before death. Exploratory puncture of the liver two days before death withdrew pus with *Entamoeba histolytica*. Autopsy revealed abscess in left hepatic lobe and that the empyema communicated through a small aperture with the pericardial cavity. [No mention is made of any preceding attack of dysentery.]

H. Harold Scott.

STREET (A.) Abscess of Liver. With Case Reports.—*New Orleans Med & Surg J.* 1928. May Vol 80 No. 11 pp 701-706. [7 refs.]

Case I. No preceding dysentery, nor residence in tropics. Amoebic dysentery with positive stool findings appeared after operation. The abscess was on under surface of liver and gave symptoms of peritonitis, as is usual in that situation. Operation—abdominal section, drainage of chocolate pus and, later, emetine therapy.

Case II. Amoebic abscess. No preceding dysentery, but residence in tropics. Abscess was near upper surface of liver. Cough and pain in chest as usual with abscesses in that situation. Operation—abdominal section, drainage of chocolate pus and, later, emetine therapy.

Case III. Bacterial abscess following suppuration in gall bladder. At onset symptoms and signs strongly suggested acute infection of gall bladder and later as abscess came to upper surface, were absolutely those of pneumonia. Operation—resection of rib and drainage.

Case IV. Subdiaphragmatic abscess following suppurative appendicitis with general peritonitis. Operation—resection of rib and drainage. Recovery in all four cases.

H M H

GILROY (J. Campbell) Tropical Liver Abscess acquired in England. [Memoranda].—*Brit Med J.* 1928. Sept. 22 p. 529.

A man of 49 years, caretaker at public abattoir. Eleven months before admission to hospital was taken ill with mucous diarrhoea. At different stages of his subsequent illness his condition appeared to be due to gallstones, carcinoma, subphrenic abscess. There was bulging of right

hypochondrium with slight tenderness edge of liver reached to $\frac{1}{2}$ inch below level of umbilicus Diarrhoea persisted and later a large red oedematous tender swelling was seen in R hypochondrium X ray showed R diaphragm pushed up and immobile At this stage examination of faeces revealed numerous *Entamoeba histolytica* At operation abscess in liver was found and 2 pints of chocolate coloured pus evacuated No amoebae or cysts found in the pus He was given pulv ipecac co and emetine-bismuth iodide gr i t.i.d Diarrhoea worsened Emetine hydrochlor injections were then given The patient died seventeen days after operation He had never been abroad nor to his knowledge been in contact with anyone who had suffered from amoebic dysentery

H M H

TONELLI (Lanfranco) La sindrome pseudo-appendicolare amebica [*Appendicular Syndrome in Amoebiasis.*—*Polislinico Sez. Prat* 1928. Aug 6 Vol. 35 No 31 pp 1487-1492.

The author relates two cases of his own in detail and three from the literature briefly The symptoms very closely resemble those of acute appendicitis the first patient was so diagnosed more than once The general condition however is not so serious and the attacks often pass off in a couple of days the diagnosis then being changed to appendicular colic. Constipation is absent in fact the stools are often diarrhoeic and examination of them reveals the *Entamoeba histolytica* On this being discovered, emetine in these cases brought about rapid cure A table showing the points of difference is given

H Harold Scott

DRENNAN (L M) Appendicitis caused by *Entamoeba histolytica* A Case Report. Notes on Amoebiasis in Colombia.—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 130-133 [United Fruit Co Hosp Santa Marta, Colombia]

No history of previous dysentery *E histolytica* present in stools. At operation undertaken for other causes, a swollen inflamed appendix buried in adhesions was detected and removed Smears from its lumen revealed *E histolytica* pus, blood, and flagellates The author insists on the clear amoebic aetiology of this appendicitis [which is puzzling, for] no ulceration was found in the appendix on macro- or microscopic examination and sections of it revealed the characteristic changes of chronic inflammation but no amoebae

H M H

MONTIEL (M L R.) & VIELLE (Albert) Un cas d'amibiase cérébrale [*A Case of Cerebral Amoebiasis.*—*Bull Soc Path Exot* 1928. Mar 14 Vol. 21 No 3 pp. 231-239

The case in an Annamite woman, is very fully described and discussed Her blood gave a positive Bordet Wassermann reaction Following on a diagnosis of cerebral tumour the skull was trephined. Exploratory needle withdrew viscid sero-purulent pus which examined without delay in the laboratory revealed no pus cells and no bacteria, but very scanty mobile amoebae These could not be stained and culture of the fluid gave negative result. The authors consider the amoebic nature of the cerebral lesion proved, for on further enquiry they learnt, for the first time that the patient had had dysentery in the past. They discuss the possible and probable route of infection of the brain

R. DESCHRETS discusses the case briefly and with Attic salt. Those who have described cases of amoebic bronchitis, nephritis, cystitis, urethritis, and even amoebiasis, have never produced the proof that these were amoebic cases. The proof required is presentation of permanent stained preparations demonstrating amoebae with their distinctive morphological and particularly nuclear characters. CARRANZO introduced directly into the bladders of kittens, living dysentery amoebae and failed to set up cystitis although kittens are peculiarly susceptible to amoebic dysentery infections which may have in them hepatic abscess sequelae. Macrophages are easily mistaken for amoebae in fresh material. Wet fixation and staining with iron haematoxylin clears up the confusion. [The guinea-pig fluid with many large motile mononuclear cells and the positive Bordet Wassermann make guinea more likely than amoeba—in spite of the previous dysentery.]

H. M. H.

BROWN (Philip W.) Treatment of Endamebiasis.—*Ann Intern. Med.* Ann Arbor 1928 Aug Vol 2 No 2 pp 177-191 [19 refs]

This study is based on observation of 178 cases in the Mayo clinic, from which enough data were available to give some idea of the therapeutic efficiency of the treatment employed. As a basis for efficiency of treatment the eradication of the parasite is held paramount.

The author's conclusions are that —

1. The organic arsenical compounds and yatren seem to be valuable additions to the treatment of endamebiasis.

2. At present the most favourable results seem to be obtained from a combination of an arsenical compound and emetine. Arsenetine by mouth may supplant emetine hypodermically except in very acute cases.

3. Trepariol and stovarsol are equally efficient, but since trepariol is rapidly eliminated, it would seem to be preferable to stovarsol.

4. Arsenic produces a small percentage of reactions. Indiscriminate use of the drug is not without risk.

5. Recurrence is more probable in those with gross ulcerative lesions of proctodeum.

6. Certain cases seem to be very resistant to treatment, but persistence and variations in treatment should effect cure in most of such cases.

H. M. H.

KNOWLES (R. GUPTA (B. M. Das) GUPTA (Ajit Kumar Dutt) & GUPTA (L. napani) The Treatment of Intestinal Amoebiasis (an Analysis of Results, and a Review of the Literature) — *Indian Med. Gaz.* 1928 Aug Vol 63, No. 8, pp. 455-482. With 1 graph in text. [168 refs.]

A very thorough and long (necessarily) review of the matter. The patient dealt with in this paper numbered 154 and 220 treatments were given them. The majority were chronic and relapsing intestinal amoebiasis. Some were "healthy" carriers. It was impossible to follow up the patients after discharge from hospital. Results must therefore be expressed in terms of the relative ratio of "probable cures" to certain failures of treatment and of the ratio of positive to negative stools after treatment.

The authors' summary and conclusions are —

(1) Akrestia speciosa ratio of probable cures to failures of 1:1.3 and of positive to negative of 1

(2) Emetine injections (alone) gave corresponding ratios of 1 17 and of 1 7

(3) Emetine injections plus Panama bismuth gave ratios of 1 18 and 1 87

The addition of large doses of bismuth appears—clinically at least—to improve the chances of eradication

(4) Emetine bismuth iodide (chiefly administered to carriers) gave ratios of 1 35 and 1 65 (Possibly it was not given in sufficient doses or for a sufficiently long period)

(5) Yatren given orally gave ratios of 1 13 and 1 8 Results did not appear better (a few cases) when yatren *per os* was combined with yatren *per rectum*

(6) Stovarsol appears to be of definite value in the treatment of chronic intestinal amoebiasis The ratios were 1 11 and 1 13.6 It is of value also for its haematonic effects

H. M. H.

BRODEN (A) La thérapeutique de l'amibiase intestinale [Treatment of Intestinal Amoebiasis].—*Ann Soc Belge de Méd Trop* 1928 June Vol. 8 No 1 pp 81-99 [6 refs.] [School of Trop Med. Brussels]

The subject matter is dealt with very fully illustrative clinical cases are described and discussed In the treatment of *E histolytica* infections the author declares emetine to be still indispensable for hepatic amoebiasis and for amoebic invasion of other organs it is sometimes beneficial too at the onset of an acute case of amoebic dysentery but even in these cure can be achieved only by yatren.

Yatren, in his experience by the mouth alone or by rectal lavage or by both, according to case—in one or more courses of treatment—is the best therapy for amoebic dysentery and especially so for the more chronic cases The era of emetine has been succeeded by the era of yatren though yatren will have its failures In his experience yatren has had but little effect on the intestinal flagellates *Trichomonas* and *Chilomastix*.

H. M. H.

PAPPALARDO (Concetto) Sulla terapia yatrenica dell amebiasi [Amoebiasis treated by Yatren.—*Policlinico Sez. Prat* 1928 Aug 6 Vol. 35 No 31 pp 1492-1499 [29 refs.] [Med. Clinic Univ., Catania.]

Eight cases of infection with *E histolytica* are noted in three of which *Giardia* was also present Treatment by yatren was given with excellent effect in all but one

Three other cases are recorded with *Giardia* infection only In two of these yatren was ineffectual in the third the parasites disappeared after duodenal lavage with 200 cc. of a 1 15 per cent solution.

H. Harold Scott

DE MELLO (Froilano) Impressões clinicas sobre o tratamento da disenteria amebiana pelo yatren purissimum [Cases of Amoebic Dysentery treated by Yatren Purissimum].—*Boi Ger Med e Farmacia* Bastora. 1928 Jan & Feb Ser 12 No 1 & 2 pp 5-7

Three cases were so treated with apparent success

H. Harold Scott.

LIU (King-Ban) The Comparative Lethal Effects of Certain Chemicals on Bacteria and Cysts of *Endamoeba histolytica* from Human Feces.—*China Med J.* 1928. Aug. Vol. 42. No. 8 pp. 568-574 [4 refs.]

A preliminary report on tests of the comparative lethal effects of certain chemicals on bacteria and cysts of *E. histolytica* in human faeces with a view to obtaining a bacteria-free culture of the amoeba. Resistance of cysts of *E. histolytica* to the chemicals tested, as determined by the culture method, was found to be different from that reported by earlier workers employing the iodine eosin staining technique. Dilutions of the chemicals recommended by those investigators for killing the cysts are much stronger than the minimal lethal solutions as determined by the author using the culture method, and the time is also somewhat longer.

1 Five-tenths per cent. chlorinated water will not kill all the bacteria, but it will kill the cysts of *E. histolytica* within 36-48 hours while one per cent. is amoebicidal without being bactericidal in 12-24 hours.

2 Potassium permanganate in 1:500 dilution, will kill the cysts in 24-48 hours but not under 24 hours. This is about the strongest solution that can be employed for attempting to make an amoebic culture free from bacteria, without devitalizing the cysts but not all of the bacteria are killed in the dilution within this time limit.

3 In 1:1000 dilution, mercuric chloride kills cysts as readily as bacteria.

The author notes that individual bacteria can be killed by these chemicals in the stated dilutions but the difficulty lies in finding a practicable method for killing them *en masse* within a short period of time. Possibly attempts to reduce bacteria in the specimen to a minimal number through some physical means e.g. temperature shocks, washing centrifuging, etc. before subjecting them to any chemical, will ultimately prove effective in providing a bacteria-free culture of *E. histolytica*.

H M H

MILLER (M. W.) Difficulty in Cultivation of *Endamoeba histolytica*.—*Proc Soc Experim Biol & Med* 1928 June. Vol. 25 No. 9 pp. 762-763. [2 refs.] [School of Med. Tulane Univ. New Orleans.]

Recounts briefly the author's failure to cultivate entamoebae by the method of BOECK and DREBOLAV for more than one day and that much only in 3 cases, from 19 patients with proved *E. histolytica* infection. However he ends by recording possession of an undoubted culture of *E. histolytica*, through 4 successive subcultures on DORELL's modification of Boeck and Drebolav's mediums. [DORELL & LAIDLAY, *this Bulletin* Vol. 24 p. 363.]

H M H

CRAIG (Charles F.) Observations upon Complement Fixation in Infections with *Endamoeba histolytica*.—*Proc Nat Acad Sci* 1928. July Vol. 14 No. 7 pp. 520-528. [11 refs.] [Army Med. School, Washington, D.C.]

BOECK and DREBOLAV's (1925) success in cultivating *E. histolytica* rendered possible the author's demonstration in 1927 [*this Bulletin*]

Vol. 25 p 228] of haemolytic and cytolytic substances in alcoholic extracts of the parasite. The haemolysin dissolved r b c s of man rabbit and guinea pig. The cytolsin dissolved intestinal epithelial cells of mucous membrane of man and cat. Bacteriolytic substances could not be demonstrated. Of practical importance is the author's finding that these alcoholic extracts could be used as antigens in a complement fixation test for the diagnosis of *histolytica* infections. In this paper the results of this test in 305 individuals are given. The author concludes that —

(1) There occur in the blood serum of individuals infected with *E histolytica* specific immune substances which can be demonstrated by complement fixation when alcoholic extracts of cultures of this parasite are employed as antigens.

(2) These complement fixing bodies disappear from the blood serum after treatment resulting in the disappearance of *E histolytica* from the faeces of the individual.

(3) Individuals free from infection with *E histolytica* do not give a positive complement fixation reaction with the alcoholic extracts of cultures of *E histolytica* nor do those infected with *E coli*, *E nana*, *Iodamoeba williamsi*, *Chilomastix mesnili*, *Trichomonas hominis* or *Giardia intestinalis*.

(4) The reaction does not occur in individuals suffering from other infections or diseases.

(5) The reaction does not occur in individuals giving a positive Wassermann or Kahn test unless infection with *E histolytica* is present.

(6) Positive complement fixation reactions occur with these antigens in individuals suffering from symptoms of infection with *E histolytica* and also in those in whom symptoms are absent, i.e. in the so-called "healthy carrier" of the parasite.

H M H

KESSEL (John F.) *Amoebiasis in Kittens infected with Amoebae from Acute and "Carrier" Human Cases and with the Tetranucleate Amoebae of the Monkey and of the Pig*—*Amer Jt Hyg* 1928 May Vol 8 No 3 pp 311-355 With 18 figs on 6 plates. [17 refs.] [Peking Union Med. College Peking]

A full report of an important and interesting investigation. It is best described in the author's own summary and conclusions —

(1) Kittens have been experimentally infected both by mouth and by rectum with dysentery amoebae of man procured from carrier cases which have given no history of dysentery. The kittens thus infected have developed the same dysenteric symptoms and exhibited the same pathology as kittens infected with amoebae from amoebic dysentery cases.

(2) Amoebae from races which produce both large and small cysts respectively have been used and both produce the same pathological conditions in kittens. From this evidence one may conclude that

(a) The resistance of the host is a more important factor in the production of clinical amoebiasis than differences in the virulence of the parasites.

(b) No evidence is produced for the conclusion of Brumpt (1928) that two species of amoebae morphologically identical, exist, the one being pathogenic and the other non pathogenic.

(3) Three kittens naturally infected with a dysentery amoeba, have been purchased from the streets of Peking. This amoeba is morphologically similar to the dysentery amoeba of man and produces the same symptoms and lesions in kittens.

" (4) Kittens have been infected with the dysentery amoeba of monkeys belonging to the genus *Macacus* and have developed dysentery and exhibited similar pathological findings at autopsy to those exhibited by kittens infected with the dysentery amoeba of man.

(5) Kittens have been infected with the amoeba of the domestic pig which is morphologically similar to the dysentery amoeba of man and have developed the same pathological symptoms as those shown by other kittens with amoebic infection.

(6) Kittens have also been infected with the dysentery amoeba of man and of the monkey respectively which have been experimentally established in the pig and then recovered in culture.

From the point of view of the pathological changes produced in kittens one may conclude that the dysentery amoeba of man, of naturally infected kittens, of the monkey and of the domestic pig are in all probability one and the same species.

(7) Amoebic infections have been established in kittens by infecting them with cysts of amoebae *per os* and *per anum* with and without the use of the celloidin plug. Fifty per cent. of positive infections were obtained when the cysts were given by mouth, without the use of the rectal plug, and 47 per cent. of positive infections were obtained with cysts by mouth and by rectum when the rectal plug was used.

" (8) Fifty per cent. of positive infections in kittens has been obtained when trophozoites from culture *in vitro* have been given *per rectum* without the use of the celloidin plug.

H. M. H.

GREEKWAY (Daniel). *Protozoologia en la Entamoeba histolytica* [Protozoophagy by *Entamoeba histolytica*].—*Arch. Argent. de Enferm. del Aparato Digest. y Nutric.* 1928. Vol. 3. No. 6. pp. 813-818. With 2 text figs. and 5 figs. on 3 plates. [1 ref.]

Mention is made of a patient infected by *Entamoeba histolytica* and *Giardia intestinalis* in whose faeces the author found some of the former (which he depicts) to contain unmistakable remnants of the latter both vegetative and cystic forms.

H. Harold Scott

BACILLARY DYSENTERY

MEXDOZA-GUAYON (M. Paz). *Some Notes on Bacillary Dysentery*.—*Philippine Islands Med. Assoc.* 1928. June. Vol. 8. No. 6. pp. 277-287. [34 refs.] [College of Med. Univ. of the Philippines.]

A thorough review of the subject. The literature dealing with Philippine bacillary dysentery records that Shiga, Flexner and Morgan No. 1 bacilli are causative agents. It causes great mortality among children and epidemics are more frequent in the rainy season. Examination of dysenteric stools has been of help in diagnosis of early and chronic cases (HAUGHWOOT). Dysentery carriers have been detected among food handlers. Serum treatment has been unsuccessful in the hands of pediatricians of the Philippine General Hospital, but has been advocated by other physicians. There is a close incidence relationship between dysentery and enteritis. Oedema in the early part of the disease is of good prognosis while in the protracted cases it is of bad omen.

The author's study of a series of cases shows that the total mortality from dysentery for the last two decades in the city of Manila is higher than that from cholera. More infants and males die of dysentery

than do adults and females. No focal necrosis is found in the lymph follicles and liver but there is degeneration proportional to the severity of the disease and the length of time of sickness. Presence of polymorphonuclears and macrophages supports findings of OOMURA that the bacilli are killed by phagocytosis and agglutination. These cells are not found in the healing stage of the ulcers. Congestion and degeneration were the only changes noted in the kidneys; no nephritis was found in young patients or in typical cases. The brain may show congestion, perivascular haemorrhages and nerve degeneration.

Acute bacillary dysentery in the mother may produce abortion and sterility and the children born may be stunted. Submucous cysts occur in which bacilli may lodge—explaining pathology of chronic carriers and relapses. Bronchopneumonia as a complication occurs more frequently in children than in adults. Appendicitis was found in three cases—in one the appendix was ruptured. There was one each of vaginitis, endocarditis, cholelithiasis and perforation of intestine. Tuberculosis was noted in seventeen cases and noma in six.

H M H

CHARLES (J. A.) *Sporadic Dysentery in a Large City*—*Lancet* 1928 Sept. 22. pp. 616-619 [10 refs.]

The paper deals with 22 sporadic cases of dysentery occurring during the present year in Newcastle. The cases occurred in 15 separate domiciliary outbreaks. Five different organisms were discovered, viz. (1) Three types of *Bact. dysenteriae* Flexner W, Z and XY. (2) a Sonne bacillus. (3) a so-called para Shiga organism. Wherever multiple infection occurred in a household the type of causal organism was the same for all the cases therein. The author discusses these cases from an epidemiological standpoint and comes to no conclusion. Sufficient data for such are lacking. There was no definable factor common to all the cases and there was nothing wherewith they could be connected together in a consecutive series. There was never any known contact between one affected family and another—either domestically, scholastically or otherwise.

H M H

KERRIN (John C.) *An Investigation of Bacillus dysenteriae* (Sonne Type 3)—*Jl of Hyg.* 1928 Aug. Vol. 28 No. 1 pp. 4-8 [20 refs.] [Marischal College, Aberdeen.]

It is a common experience that organisms isolated from cases of bacillary dysentery do not give the characters of the classical types of *Bact. dysenteriae*. The Sonne organism is one of these divergent types. The illness caused by this organism is mild and the stools may contain no blood, but usually show mucus and pus. Colonies of this organism on MacConkey's bile salt neutral red agar are larger than those of *Bact. dysenteriae* (Flexner or Shiga) frequently show crenated edges and are more delicate and translucent than those of the paracolony bacillus. Eleven strains have been isolated in routine examination. These organisms fermented glucose and mannite in 24 hours and lactose and saccharose after some days; they were non-motile, indol-negative and inagglutinable with polyvalent Flexner serum.

Bact. dysenteriae (Sonne Type III) is differentiated from the *Bact. dispar* group a name given to the lactose fermenters of the dysentery group (ANDREWES 1918) by being indol negative and xylose negative. It is usually unagglutinable when freshly isolated but will remove all agglutinins from a Sonne serum by absorption.

W F Harvey

EVANS (W Howell) Fulminating Dysentery in a Child, caused by *B. dysenteriae* Sonne.—*Brit Med J* 1928 July 21 pp 98-97 [10 refs]

A previously healthy boy aged 10 died after 16 hours illness which began suddenly with vomiting and continued with severe frequent diarrhoea. Autopsy revealed nothing beyond intense congestion and catarrh of intestine. Cultures from large intestine and ileo-caecum lymph glands yielded abundant and pure growths of the Sonne bacillus.

H M H

CALABE (G) Recherches sur les bacilles dysentériques isolés en Roumanie [Dysentery Bacilli isolated in Roumania].—*Arch. Roumaines Path. Expériment. et Microbiol.* Paris. 1928 June. Vol. 1 No 2 pp 243-269 [61 refs] [Serotherap Inst. Bucharest]

The interest of this paper lies especially in the observations made upon the group denominated atypical dysentery bacilli and on the importance attached to serological and antigenic relationships for classification. The atypical bacilli studied were only those non-motile strains which did not ferment lactose. Such aberrant forms have been found towards the end of the disease or in stools which have been kept for several days, as may be the case with those sent to a laboratory by post. They were never met with in the 7 or 8 first days of a case of dysentery, nor were they to be found existing alongside Shiga or Flexner bacilli. Anti-Shiga and anti-Flexner serums do not agglutinate these atypical forms while they are hyo-resistant to a lytic agent which is active for Shiga and Flexner bacilli. Animals immunized with any of these atypical strains furnished sera, sometimes agglutinating true Flexner bacilli and sometimes both Flexner and Shiga bacilli. This is equivalent to saying that their antigenic power is identical with that of the true dysentery bacilli. The atypical bacilli themselves were normally agglutinated only by their own specific sera and not by the sera of animals immunized with true dysentery bacilli. And yet these serological characters could be completely altered by a sojourn of 48 to 72 hours in the body of the rabbit. They became then strongly agglutinable by either Shiga or Flexner sera. Now as true dysentery bacilli can lose their serological and bio-chemical characters with age or cultivation, it seems difficult to avoid the conclusion that the atypical dysentery organisms of the stools and true dysentery organisms have a common origin and that the former are phylogenetically derived from the latter. A natural classification of these variable organisms should accord preference to antigenic characters as more stable than biochemical and even serological characters.

W F Harvey

CASTELLANI (Aldo) **Further Observations on Metadysentery and the Metadysentery Bacilli, with Remarks on the Classification of Bacterial Dysenteries.**—*Jl Trop Med & Hyg* 1928. Aug 1 Vol. 30 No 15 pp 185-194 [19 refs]

The author elaborates further (see this *Bulletin* Vol 25 p 230) his conceptions regarding the group of organisms denominated by him metadysentery which are differentiated from the true or Shiga dysentery group and the paradysentery or Flexner group. This metadysentery group was originally described as consisting of bacilli which do not produce gas in any sugar but either ferment lactose (acid only) and clot milk or clot milk without fermenting lactose or ferment lactose and clot milk. In practice it is advantageous to make a single group of the metadysentery bacilli as the clotting of milk is not a sufficiently definite differential character. The tribe Ebertheae as defined by CASTELLANI and CHALMERS is discussed from the point of view of subtribes, genera and species. Keys and differential tables which facilitate differentiation are given.

Some organisms of the metadysentery group are non pathogenic, others pathogenic and there are several clinical types of metadysentery.

W F Harvey

SCHÖBL (Otto) & VILLAAMIL (Rita) **Notes on Bacteriological Diagnosis of Bacillary Dysentery**—*Philippine Jl Sci* 1928 Feb Vol. 35 No 2. pp 133-149 With 7 text figs. [9 refs.]

Emphasis is laid on the need to make special selection from the stool of shreds of mucus and blood for bacteriological examination. The examination must be made as early as possible before the bacteriophage is able to render successful isolation impossible. The technique of isolation is in sequence: inoculation of material on lactose methylene blue-eosin agar; examination for motility; microscopic agglutination reaction; growth of isolated organism on lactose-glucose double sugar medium; mannite, maltose and saccharose. With this arrangement of procedure a preliminary report can sometimes be given to the physician in 8 to 10 hours. In the agglutination test a horse serum, polyvalent for both fermenters and non-fermenters of mannite was used.

W F Harvey

MENTON (J) **Limitations of the Agglutination Reaction in the Diagnosis of Bacillary Dysentery**—*Brit Med Jl* 1928 July 21 pp 97-98 [5 refs]

The outbreak which formed the subject of investigation occurred in an institution in which dysentery had been endemic for years. There was then every possibility of there being several sources of infection and several types of bacillus. It involved 120 cases and the sera of 47 affected individuals were examined. Standard Flexner types, V W X, Y and Z and the Dreyer technique were used. Altogether 19 cases reacted positively and 28 negatively in the testing. Ten cases which were negative at first examination were positive later. Very divergent opinions exist as to the value of agglutination tests in dysentery. In this epidemic it was found that one negative agglutination did not exclude acute bacillary dysentery. The tentative diagnosis of Flexner infection could be made on repeated agglutination tests.

Bact. dysenteriae (Sonne Type III) is differentiated from the *Bact. dysenter* group, a name given to the lactose fermenters of the dysentery group (ANDREWS 1918) by being indol negative and xylose negative. It is usually inagglutinable when freshly isolated, but will remove all agglutinins from a Sonne serum by absorption.

W F Harvey

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H. M. H.

CALALA (G) Recherches sur les bacilles dysentériques isolés en Roumanie [Dysentery Bacilli isolated in Roumania].—*Arch. Roumaines Path. Experim. et Microbiol.* Paris. 1928 June. Vol. 1 No. 2 pp 243-269 [61 refs.] [Serotherap. Inst., Bucharest.]

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W F Harvey

CASTELLANI (Aldo) Further Observations on Metadysentery and the Metadysentery Bacilli, with Remarks on the Classification of Bacterial Dysenteries.—*Jl Trop Med & Hyg* 1928 Aug 1 Vol 30 No 15 pp 185-194 [19 refs]

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Some organisms of the metadysentery group are non pathogenic others pathogenic and there are several clinical types of metadysentery.

W. F. Harvey

SCHÖEL (Otto) & VILLAMIL (Rita) Note on Bacteriological Diagnosis of Bacillary Dysentery.—*Philippine Jl Sci* 1928 Feb Vol 35 No 2 pp 133-149 With 7 text figs 9 refs

Emphasis is laid on the need to make special selection from the stool of streaks of mucus and blood for bacteriological examination. The examination must be made as early as possible before the bacteriophage is able to render successful isolation impossible. The technique of isolation is in sequence: inoculation of material on lactose-methylene blue-cream agar; examination for motility; microscopic agglutination reaction; growth of isolated organism on lactose-glucose double sugar medium, mannite-melose and saccharose. With this arrangement of procedure a preliminary report can sometimes be given to the physician in 8 to 10 hours. In the agglutination test a horse serum, polyvalent for both fermenters and non-fermenters of mannite was used.

W. F. Harvey

MENY (J.) Limitations of the Agglutination Reaction in the Diagnosis of Bacillary Dysentery.—*Br. Med Jl* 1928 Jul-21 pp 57-59 [5 refs]

The outbreak which formed the subject of investigation occurred in an institution in which dysentery had been endemic for years. There was then every possibility of there being several sources of infection and several types of bacilli. It involved 120 cases and the sera of 47 affected individuals were examined. Standard Flexner types V, VI, VII, VIII and Z and the Drever technique were used. All cases reacted positively and 20 negative in the first examination. Ten cases which were negative at first examination were positive. Very divergent opinions exist as to the value of agglutination diagnosis. In this epidemic it was found that one negative result did not exclude acute bacillary dysentery. The tentative diagnosis of Flexner infection could be made on repeated agglutination.

are the small submucosal petechial haemorrhages which may surround the actual ulcers, or be scattered haphazardly. Large haemorrhages often occur in the interstices or even in ragged cracks between the folds of mucosa.

Acute stage—There may be considerable destruction of mucosa. Discrete lesions may coalesce to produce ragged bleeding granulations—resembling lesions of bacillary dysentery except that bowel surface is much folded. The condition in fact resembles the intense process set up in experimental amoebiasis of kittens.

Subacute stage—Rugose and folded bowel surface. Minute yellow papular elevations—really submucosal abscess nests of amoebae—which, on breaking down form snail track ulcers, and later the diamond or lozenge shaped ulcers of the chronic stage.

Chronic stage—Definite ulcerations 5 mm. or more in diameter superficial, with ragged edges deep into submucosa. Usually undermined edges haemorrhagic margins, and yellowish or grey bases.

Latent amoebic dysentery—Yellow papules on the inner surface of the natural folds of the gut, e.g. on Houston's valves. Or the mucosa may be studded with very small shallow pits which represent healed ulcerations, often mingled with which are small haemorrhages.

Carriers or cyst passers—Either small granulating patches or small scattered petechial haemorrhages indicating site of minute amoebic lesions. It is thus clear that in these "cyst passers" there may exist lesions which may extend and give rise to ulcerations evoking active signs of amoebic dysentery.

For microscope—Scrapings from bowel ulcers or papules, or from haemorrhagic spots, will often disclose amoebae or the characteristic Charcot Leyden crystals when many searches in stool samples had failed to reveal them.

After treatment—Healed bowel shows no abnormality of colour but many small pits where ulcers have healed.

Bacillary dysentery—A disease of the mucous membrane in which the dysentery bacillus multiplies and eventually causes its necrosis. Infiltration and oedema of submucosa are secondary to changes in mucosa. Pathological changes in bowel wall are much more severe and extensive than are those of amoebic dysentery.

Acute stage—In the very acute early stage sigmoidoscopy is hardly justifiable. The mucosa resembles that seen at autopsy. The surface is slightly nodular rose pink or plum red and oedematous, numerous red blotches caused by submucous haemorrhages. The walls of gut are rigid and inelastic the natural folds are absent. Mucosa bleeds readily on touch, and the examination gives pain. Lumen of gut is filled with bright red bloody mucus.

Subacute stage—Granulations in irregular patches, and plaques where necrotic mucosa has desquamated or been removed. The granulations are painful and bleed easily.

Chronic stage—Mucosa has been converted into a solid layer of granular tissue. (This is the idiopathic ulcerative colitis of the text books and, none other so the author contends than the sequel of dysentery bacillus infection of the bowel.)

The bowel is a rigid indurated inelastic raw bleeding tube with natural folds absent. Examination is extremely painful and the rough granular surface bleeds readily on touch. Exuberant granulations may be polypoid. Sometimes fibrosis of bowel wall may result in partial stricture or in fibrotic scarring of surface. Help in diagnosis is given by patulous anus, and atrophic appearance of skin around it and by wasting of gluteal and perineal muscles.

Intestinal schistosomiasis—Sigmoidoscopy in the two cases studied revealed irregular patches of granulation tissue dispersed through mucous membrane of upper rectum and around recto-sigmoidal junction. Granulations slightly raised and capped with yellow adherent lymph. In scrapings of this granulation tissue microscopic examination discovered the lateral-spined ova.

Sprue—One of the mysteries of tropical medicine its aetiology is still unknown and its correct investigation is one of the burning questions of the day. One early case (the only case so far recorded from Nyasaland) disclosed through sigmoidoscope a ridged and folded mucous membrane finely granular on surface, cherry pink to scarlet in colour. Viscid adherent mucus, liquid peculiarly white faeces. In advanced stages with atrophy of mucous membrane the latter is lax, pale yellow almost diaphanous, so that great care is needed lest the attenuated and friable bowel wall be torn.

Tuberculosis of large bowel—The author points out is not an infrequent sequel of bacillary dysentery. It appears as acute ulcerative colitis. The patients are extremely ill and emaciated. The mucous membrane is greatly indurated, hyperaemic and sensitive, plush colour and bleeds readily to touch. The tubercle bacillus may be demonstrated in scrapings, or more usually in the bloody mucous exudate after digesting the whole stool with antiformin and centrifuging.

H M H

KHALID (Zaky) *Micro-Organisms of Diarrhoea and Dysentery of Children in Egypt*.—*Jl Egyptian Med Assoc* 1928 June Vol. 11 No 6 pp 195-207 With 2 text figs

During four summers the author has examined in children (18 hours to 8 years old) 476 cases of diarrhoea and 150 control cases i.e. children not suffering at time of examination from any bowel symptoms

	Diarrhoea cases	Control cases
<i>Microscopically</i>	Per cent	Per cent
<i>Trichomonas</i>	4	1.5
<i>Lamblia</i>	3	0
<i>Oxyuris</i>	9	5.0
<i>Ascaris</i>	2	1.5
Negative	82	97.0
<i>By culture</i>		
<i>B. carolinus</i>	30	4
<i>B. Morgan No. 1</i>	12	2
<i>B. pyocyaneus</i>	5	0
<i>B. Gaertner</i>	7	0
<i>B. fecalis alcaligenes</i>	4	3
<i>B. proteus</i>	5	2
<i>B. coli communis et communior</i>	37	89

Two (*Macacus sinicus*) monkeys fed with massive doses of *B. carolinus* developed fever, emaciation and continued loose stools and died on the 16th and 18th day respectively. Autopsy revealed marked congestion of large intestine especially sigmoid and caecum.

Dysentery—142 cases were examined and revealed —

Dysentery bacillus Shiga	19 cases
Dysentery bacillus Flexner and Y	76 "
B. Morgan No 1	20 "
B. pyocyaneus	4
E. histolytica	10
B. paratyphosus A or B	4 "
B. asiaticus	3 "
Negative	6 "

The distinction between diarrhoea and dysentery was clinical.

H. M. H.

PHILPS (Earle B.) & DÁVILA (Jorge Victor) *Diarrhoea and Enteritis in Porto Rico. II. Relation to Water Supplies.—Porto Rico Rev. of Public Health & Trop. Med.* 1928 May Vol. 3. No. 11 pp 468-487 With 4 charts. [3 refs.]

The authors conclude from the statistical evidence here set out, analysed and discussed, that diarrhoea and enteritis under one year of age as reported in Porto Rico is probably of different origin and possibly therefore of somewhat different type from the disease of the same name as reported in the higher age groups and that in all probability the disease reported in those age groups over one year is to a large extent water-borne. Such conclusions are necessarily tentative until further tested by appropriate bacteriological or other aetiological studies or until confirmed by further studies of improvement following the installation of satisfactory water purification in the cities.

H. M. H.

HOSHIZAKI (Soto) *The Clinical and Bacteriological Examination of Dysentery in Dairen, South Manchuria.—Jl. Oriental Med.* 1928. July Vol. 9 No. 1 English summary pp 14-16 [In Japanese.]

1,220 cases have been treated in the isolation hospital in the past 10 years, 1,114 Japanese 106 Chinese. The mortality of Chinese was three times higher than that of Japanese. Ratio of bacillary to amoebic dysentery was 34:1. Bacillary dysentery mortality 54.9 per cent. including ekim 44.6 per cent. amoebic dysentery 17.2 per cent. Ages of greatest frequency were 1 to 5 years, in children 20 to 30 years in adults. Months of greatest frequency are July August September. Dysentery bacilli strains isolated were—Shiga, original type 39.3 per cent. Y Hiss-Russell, 46.1 per cent. Flexner 5.6 per cent. Strong, 5.6 per cent. Mannite non-fermenter serologically not Shiga, 3.5 per cent. In convalescence serum agglutinated Shiga type bacillus—160 cases. Y type 180 cases. Flexner type 260 cases. Most of the Shiga strains were isolated from children in middle of epidemic. In the 1927 epidemic toxic symptoms were least marked in Shiga infections and Shiga case mortality was 24.4 per cent. as against the others 39.4 per cent. Of 371 cases of dysentery 19 were family infections.

H. M. H.

MATTOS (Amaral) Sobre alguns casos de dysenterias parasitarias em lactentes [Parasitic Dysentery among Infants].—*Sciencia Med* 1928 Apr Vol. 6 No 4 pp 184-191 [1 ref]

A statement handed down and generally believed is that amoebic dysentery is almost unknown up to the age of six months. The author gives accounts of three cases, aged 5 months 40 days and 6 months respectively in which he found amoebae and which cleared up on proper treatment after various non-specific measures had failed. He notes that in parts of Brazil the infantile mortality is high particularly from intestinal affections. The causes assigned are congenital debility, gastro-enteritis atrepsia, etc. but it is probable that many of these cases are amoebic since amongst 25 children recently under the author's care five had amoebic dysentery.

H Harold Scott

MITSUNASHI (Chiaki) [Epidemiology of Dysentery in the Dormitory of the Higher Women's Normal School].—*Nihon Densetsuokakurui Zasshi* (Jl Japan Soc of Infectious Dis) 1927 Oct Vol. 2 No 1 [Summarized in *Japan Med World* 1928 May 15 Vol. 8 No 5 p 129]

Thirty-six cases occurring "explosively" In all symptoms were very slight had the cases occurred sporadically they would have been treated as non-dysenteric. Bacteriological investigation revealed Kawase strain of dysentery bacilli.

H M H

DE LANGEN (C D) Flagellata Diarrhoea and Diet.—*Acta Leidensia* (Scholae Med Tropicae) 1927 Vol. 2. pp 137-142.

Five flagellate protozoa occur in the human intestinal canal—viz. *Giardia lamblia*, *Trichomonas hominis*, *Chlamydomonas mesnili*, *Embadomonas intestinalis* and *Enteromonas hominis*. The first three are the most frequent. Flagellate diarrhoea is often heard of. It has one symptom only—frequency of stools in which numerous flagellates are found. During recovery the flagellates disappear partially or entirely from the stools though remaining cysts of *lamblia* can still be found. Cysts of *trichomonas* have not yet been discovered. It has not been proved that the flagellata cause the diarrhoea. It may be only that altered intestinal conditions have enabled intense multiplication of the parasites. In fact large numbers of flagellates are often found in unhealthy intestinal conditions when the aetiology of the unhealthy intestinal condition is quite clear and when recovery takes place the flagellata disappear.

Thus in clinical practice little notice is taken of these flagellates. If in large numbers they are got rid of fairly successfully by means of yatren and stovarsol, and sometimes it is noted that with their disappearance goes too the intestinal affection complained of.

HEGGER found that *trichomonas* and *lamblia* disappeared from the intestinal canal of their animal hosts when these were fed on a meat diet. The author has investigated the effect of meat diet on nine human patients with frequent diarrhoea and numerous *lamblia* or *trichomonas* in the stools. Those reacted best on the meat diet who had very large numbers of flagellates in the stools and faulty carbohydrate digestion; some however with no faulty carbohydrate digestion reacted well to

have not been noted among sufferers from framboesia on the other hand 60 cases have been seen among syphilitics. Cangosa, too the author excludes from among yaws manifestations. In none of six cases of gonorrhea seen in Brazil was there any evidence of yaws. B. W. reaction was always positive in eruptive cases, negative after treatment the cerebrospinal fluid is always normal the blood shows a constant increase in large mononuclears. Treatment by potassium iodide intravenously gave good results but the best were obtained with 606 and 914 and other arsenicals. Tartar emetic failed, methylene blue was not satisfactory and bismuth preparations disappointing.

H. S. Stannus

LEGER (Marcel). Le pian et sa quasi-disparition de certains pays de l'Amérique. [The Apparent Disappearance of Yaws from some American Countries. — *Bull Soc Path Exot* 1928 June 13 Vol 21 No 6 pp 428-432. (13 refs.)]

The author after referring to the observation of ARATJO that yaws was widespread in certain provinces of Brazil and rare in others points out that the same is true elsewhere and that in French Guiana, Guadeloupe and Martinique the disease which was at one time common, at the present time may be said hardly to exist. The disease was introduced into Guiana by African slaves. BAYON (in 1777) described the disease as commonly seen. CLARAC (1902) found it rare except among imported Indians and Africans. Between 1917-19 after careful investigation, the author only found three cases by bacteriological diagnosis, since when no cases have been reported in the annual medical reports from French Guiana. Similarly in British Guiana yaws, which had been formerly widespread was reported by DANIELS in 1896 to have disappeared. It was present in British Guiana in 1925 — [J. F. C. H.] On the contrary in Dutch Guiana, which is sandwiched in between the British and French colonies, yaws persists affecting large numbers. The frequency of infections in Guadeloupe was testified in 1725 by Père LABAT who stated that the disease was well known to the native Carib population before the advent of African slaves now the disease is unknown. In Martinique it persists in certain areas. In Barbadoes, however the disease has almost disappeared, while still found widespread in other of the British West Indian islands. These strange facts offer a field for investigation the forces at work in causing this patchy disappearance of framboesia are still unknown.

H. S. S.

BULLETTIN DE LA SOCIÉTÉ DE PATHOLOGIE EXOTIQUE. 1928. Apr 18. Vol. 21 No 4 pp. 277-281. [Municipal Polyclinic, Saigon] — Conférence sur l'évolution clinique du pian. [The Clinical Development of Yaws.]

An account of a lantern demonstration (74 slides) showing the clinical evolution of yaws as seen in Cochin China. The author insisted on the morphological resemblance of the primary lesion to the primary chancre of syphilis, at the same time pointing out the many differences. He also insists on the pruriginous character of all framboeal lesions. The secondary stage is characterized occasionally by the appearance of a roseola often mixed and then by a macular

eruption consisting of minute raised furluraceous papules having the appearance of keratosis pilaris but in reality minute yaws most of which disappear spontaneously before the development of the few into florid secondary lesions. Some secondary lesions are tuberculo-papular and others psoriasiform in character. Hyperkeratosis of the palms and soles with fissuring and ringworm like lesions are common throughout this period. The tertiary period is characterized by ulcerative gummatous lesions of soft parts and bones a rarifying osteitis as shown by X ray examination being characteristic

H S S

CORDES (Wilhelm) *Lichen spinulosus a Manifestation of Late Framboesia.*—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 168-170 With 1 text fig [United Fruit Co Hosp Preston Cuba]

Among 110 patients in the Preston Hospital Cuba during the year who showed symptoms or gave a history of yaws, two presented the condition called *Lichen spinulosus seu pilaris* a condition considered to be practically identical with *Keratosis pilaris*. They were male Haitians aged 25 and 55 years who had contracted yaws in childhood. Memcke test + + + After treatment with bismuth and neosalvarsan the itching ceased but there was no change in the lesion during 3 and 4 weeks. A section of skin examined showed slight papillary out growth of the corium with lymphocytic infiltration around the blood vessels—also marked hyperkeratosis at the mouths of the hair follicles.

H S S

CHOPRA (R N) GUPTA (J C) & MILLICK (M N) *A New Organic Aromatic Compound of Bismuth Suitable for Intravenous Injection in the Treatment of Framboesia.*—*Indian Med Gaz.* 1928 July Vol. 63 No 7 pp 361-363 [4 refs.] [School of Trop Med. Calcutta.]

As the result of enquiries by the authors for a safe compound of bismuth for intravenous use Dr GHOSE has prepared a bismuth analogue of urea-stibamine containing just over 50 per cent of bismuth which has been given the name of Bismene and to which has been assigned the following formula $\text{NH}_2\text{CO-NH-C}_6\text{H}_4\text{BiO(OH)ONO}$. Doses of 0.1 to 0.15 gm. have been tried in a few cases of yaws with promising results 4 injections at weekly intervals being followed by the disappearance of the secondary eruption.

H S S

POKROIS. *Le traitement du pian par l'oxyiodogallate de bismuth* [Treatment of Yaws by Airol.]—*Bull Méd du Katanga* 1928 Vol. 5 No 1 & 2. pp 15-16

Three years ago the author drew attention to the many advantages possessed by oxyiodogallate of bismuth (airol) in the treatment of yaws. 20 grams of airol are triturated with 100 each of glycerin and water a little at a time to make an even paste before adding the whole. A series of 10 weekly injections of 1-4 cc according to age is given intramuscularly. A small quantity of iodine is liberated in the

preparation which obviates sterilizing the mixture. The advantages claimed are small cost, ease of preparation, ease of administration compared with oily preparations—sterilization is dispensed with, yet sepsis never occurs (7 000 injections). The W. R. is rendered negative almost as quickly as with 914. Stomatitis is very rarely produced (5 cases among the 1 000 patient.)

H. S. S.

SCHÖBL (Otto) *Experimental Yaws in Philippine Monkeys and a Critical Consideration of our Knowledge concerning Framboesia Tropica in the Light of Recent Experimental Evidence.*—*Philippine Jl Sci* 1928. Mar. Vol. 35 No. 3 pp. 209-332. With 1 text fig. & 30 plates. [32 refs.]

In view of the conflicting results obtained by early workers in this field the urgent necessity for further investigation and experimental work in connexion with yaws has several times been alluded to in these columns. During the past year a most valuable series of papers by Schöbl and his colleagues have been published in reference to yaws, and the present contribution by this author is perhaps the most valuable addition to the study of that disease which has appeared since the discovery of *T. pertenue*. His own conclusions are as follows—

"1 The Philippine monkey is an excellent experimental animal, due to its high susceptibility to yaws and on account of the variety of clinical lesions that can be produced experimentally in this animal.

"2 The local lesion produced by intradermal inoculation of Philippine monkeys is a yaw clinically and anatomically identical with that produced in human volunteers experimentally.

"3 The early metastatic yaws lesions produced in Philippine monkeys by superinfection—that is, the typical metastatic yaw, the inguiform yaw, the early framboesides including psoriasis palmaris—are clinically and anatomically identical with metastatic manifestations of yaws in humans.

"4 The late yaws lesions, such as the ulcerative form, lupus-like lesions, gangosa, and the late framboesides, such as ichthyotic yaws lesions, and the keratoderma plantare as produced in monkeys by superinfection, are clinically and anatomically identical with these lesions as they occur in man.

"5 The duration of incubation of local yaw is the same in Philippine monkeys as it has been established to be in human volunteers.

"6 The incubation of the metastatic generalization of yaws produced in Philippine monkeys by superinoculation is the same as that found in human volunteers upon experimental inoculation.

"7 The duration of early yaws manifestations as well as that of the late ones is much shorter in Philippine monkeys than is found by clinical experience to be the case in man.

"8. However the proportion of the duration of early yaws manifestations to the duration of late yaws manifestations is about the same in monkeys as in man.

"9 The immunity which consists of resistance to superinfection and resistance to metastatic generalization as well as of modification of the early and late lesions that take place at the time when the resistance to superinfection starts to develop set in with Philippine monkeys much earlier than was found to be the case in experimentally inoculated human volunteers.

"10 The fact that the period of metastatic dissemination of yaws is much more limited in monkeys than in man is due to the early onset of immunity.

11 The healing of existing yaws lesions particularly the early ones is independent of the resistance to superinfection Yaws lesions in monkeys as in man may heal while the animal or the man is still susceptible to superinfection and existing lesions will persist a long time after the stage of resistance to superinoculation has fully developed

12 From this it is evident that the reinoculability of yaws animals cannot be used as a criterion for complete therapeutic sterilization of the yaws infected body organism

13 The resistance to superinfection once achieved is persistent and no amount of treatment can cause the animal once it has become resistant to take infection again

14 The Wassermann reaction is indefinite and ephemeral in the case of local yaws Its strength and persistence depend upon the duration of infection the number of yaws lesions, the intensity of the lesion and to a lesser extent on the number of superinoculations

15 The Wassermann reaction if it has become negative due to treatment or spontaneous healing and if all the lesions have disappeared will reappear upon unsuccessful superinfection or reinoculation with viable material

16 The serologic reactivity of the body organism to superinfection (that is the reappearance of the Wassermann reaction and the reactivity of the organism to treatment which manifests itself as a disappearance of the Wassermann reaction) becomes sluggish upon repeated reinoculations and treatment

17 The reappearance of a positive Wassermann reaction can be produced in healed and cured animals without recurrence of yaws lesions and therefore a positive Wassermann reaction does not necessarily mean the existence of *Treponema pertenue* in the body organism of the animal

18 The focus from which the treponemas are disseminated into the surrounding tissues or metastatically into remote parts of the body is the skin

19 In lymph glands corresponding to the active lesions *Treponema pertenue* can be found in a fairly high percentage of cases while the early lesion is active but *Treponema pertenue* was never found in the lymph gland when the lesion had healed either spontaneously or due to treatment

20 Spontaneous relapses do not occur in experimental monkeys when they reach the stage of resistance The temporary stay of *Treponema pertenue* in the regional lymph gland indicates the route through which generalization in yaws takes place but it has no significance with regard to possible relapses after a period of latency

21 The latency in yaws followed by relapse depends upon the time relation between the healing of the existing yaws lesions and the incubation period of the metastatic yaws

Everyone interested in yaws must read this paper and re-study clinical yaws in the light of some new ideas therein expressed. A good many points still remain to be solved and it is to be hoped Schöbl will continue his investigations

H S S

PASQUAL (J Hylton) Goundou and Yaws.—*Trans Roy Soc Trop Med & Hyg* 1928. June 30 Vol. 22. No 1 pp 59-60

The author reports a case of goundou in a boy aged 4 years of the Berum tribe on the Bauchi Plateau Nigeria There was no history of syphilis or of yaws in the patient or other members of the family and the district is said to be yaws-free No W.R. possible The symmetrical paranasal swellings were the size of African hens eggs and typical The past history in this case includes the assertion on the part of the mother that there was a swelling about the size of a pea noticed on the bridge of the nose by the parents at birth, and that there was a discharge from the nose soon

after birth which was however at no time sanguinous. [This statement is accepted by the author as evidence that gonodon may be congenital whereas this case and the original case figured by MAXSON are the only two I believe in which the congenital lesion has been considered and both rest merely upon the description given by a native parent.]

H S S.

NIGERIA ANNUAL MEDICAL & SANITARY REPORT 1927 Appendix G
Reports on Interesting Cases by Medical Officers. Some Affections
of the Hands due to Yaws [ADCOCK (E. W.)] pp. 115-116
Report on Cases of Climatic Bubo treated by Protein-Shock
HALL (R. N.) pp. 117-118 Notes on a Case of Gonodon
[CRAWFORD (E. J.)] p. 120 With 4 figs on 1 plate.

(a) A note drawing attention to the frequency with which a condition resembling Dupuytren's contraction is met with among natives of Benin City. This condition is commonly found in its severer forms among those who follow the trades of masons bricklayers and carpenters, is produced by a chronic thickening of the skin spreading to the flexor tendons and is considered to have a frambœsial etiology. Yaws is said to be a common complaint in this part of Nigeria.

(b) Three cases diagnosed as climatic bubo and treated by protein shock [intravenous injection of T.A.B. vaccine the method first adopted by HANSCHÉLL] are here reported.

(c) A case of gonodon, the paranasal tumours being of considerable size and associated with osteitis of the mandible. [This case resembles some of those recorded by BOTREAUX ROUSSEL. The question of etiology is not mentioned.]

H S S.

CARROLL (R. L.) Report of a Case diagnosed as Gonodon.—Sixteenth
Ann Rept Med Dept United Fruit Company Boston Mass
1927 pp. 165-167 With 1 text fig. [Almirante Hosp Panama.

A note of the case of a Jamaican negro aged 46 years seen in Panama presenting a left paranasal tumour with the characteristics of gonodon. The bony hard tumour was 3.5 cm. long and 2.5 cm. wide involving the nasal process of the superior maxilla and almost occluded the left nasal passages. His blood gave a positive Neisser's test for syphilis but he showed no syphilitic nor presumably frambœsial lesions. Antisyphilitic treatment had no effect, but he gave a history of injury by a piece of wood to the left side of the nose 4 years before and of a nasal discharge which had commenced before the trauma and persisted for 3 months afterwards. The patient stated that he had seen three other cases similar to his own in Jamaica.

H S S.

KADACKER (M.) Un cas de nodosité joynit-articulaires chez un blanc
[Case of J.A.W. in a White].—Ann Soc Belge de Méd Trop 1928.
June Vol 8. No. 1 pp 57-58. With 1 text fig.

Reports the case of a Portuguese stone-mason aged 29 m t with in the Belgian Congo where he had resided for three years presenting typical J.A.W. on the posterior border of each ulna close to the elbow. These had first been noticed ten months previously. There was also a fibrous bursitis of the right prepatellar bursa due to his work. Previously he had lived for some years in Brazil. There was no history and no evidence of syphilis or yaws.

H S S.

ARAKAKI (A.) Ein Fall von Nodosität juxta articulaires (Jeanselme) beobachtet bei einem Japaner [J.A.N in a Japanese]—*Japanese Jt Dermat & Urol* 1928 Aug Vol 28. No 8 German summary p 58 [In Japanese pp 816-824 42 refs] (Dermat Clinic Imperial Univ Sendai Japan)

There are very few references to this condition in Japanese literature TAKASAKI (1924) described 14 cases among natives of Palau Island TOKUOKA (1911) a case in Ryojun (Port Arthur) a man who had been in Formosa STEINER two Japanese in Java No cases have been seen in Japanese who had never left their own country This is true of the case now described—a merchant aged 43 living in Hokkaido one of the north east islands of Japan, admitted to hospital for tuberculosis of the bladder He had noticed for 10 years hard moveable subcutaneous nodules at both elbows and more recently in connexion with the tendo achillis of each side These resembled clinically and histologically J A N but there was no history of syphilis or yaws and the W R was negative He had visited southern China and Formosa.

H S S

MARTIN (Hans) Ein Beitrag zur Frage der juxtaartikulären Knotenbildungen bei Syphilis [Juxta-Articular Nodules in Syphilis.]—*Dermat Ztschr* 1928 Juli Vol 54 No 1 pp 26-32 9 refs]

The author records the case of a male aged 32 who in 1916 developed a penile sore in Roumania which healed with local treatment and no other signs or symptoms He married in 1921—wife and child clinically and serologically healthy at time of examination in 1927 when the man showed 4 or 5 nodes the size of a hazel nut to a walnut about the right ankle these were tender moveable and discrete the skin over them was normal W R negative and no signs of any other disease

Under treatment with salvarsan they underwent rapid retrogression to size of pea In the discussion of this case the author refers to the other similar cases which has been recorded outside the tropics and which have all been noticed in this *Bulletin*

H S S

JAHNEL (F) & LANGE (J) Syphilis und Framboesie im Lichte neuerer experimenteller Untersuchungen [Syphilis and Yaws in the Light of Recent Experimental Work.]—*Arch Hoch* 1928. Nov 4 Vol 7 No 45 pp 2133-2140 [30 refs] (German Research Inst for Psychiatry Munich]

In a very interesting survey of the present position regarding the relationship of yaws and syphilis the authors pass in review practically all the evidence bearing on this fascinating problem and most important of all, they subject it to careful criticism showing how untrustworthy are many observations how wrong are many interpretations put on results how misleading are many descriptions and how many may be the pitfalls in experimental work. Yaws it has been held is phylogenetically older than syphilis the distribution of yaws recedes as a higher level of culture spreads over the world. Syphilis is said by some to have reached Europe from America, but the same documentary evidence has been shown by others to prove that yaws originated among the old inhabitants of the New World Historical material however really yields no conclusive evidence in either case Similarly the belief that yaws was conveyed to America from West Africa by slaves is unsubstantiated. All such theories which accounted for yaws as syphilis modified by race and climate fall to the ground

when the problem receives careful study though it is of course recognized that climate may play a part in modifying the clinical picture of yaws. All evidence at the present time goes to prove that yaws remains yaws and syphilis syphilis, but except for the typical secondary exanthem yaws cannot be differentiated from syphilis and even in this connexion it is said that a framboesiform syphilide may occur. It is only recently and in countries where syphilis is believed to be absent that many tertiary manifestations have been claimed as due to yaws.

The authors refer to their work on inoculation of cases of G.P.I. with various strains of *Treponema pertenue* and point out that because their cases were refractory to two strains from America no generalization is permissible this would hold good even though other strains gave equally negative results as NICHOLS has shown that single strains may give different reactions in animal experiments and certainly different strains give varying effects in intratesticular rabbit inoculations. There may be different clinical types of yaws as evidenced by descriptions of this disease emanating from different countries. All results from animal experiments must be received with great reserve many have been invalidated, when testing artificially induced immunity by the length of time which must be allowed to elapse before making the second inoculation and the whole question is surrounded with technical difficulties. In syphilis KOLLIE showed that many strains of syphilitic virus do not exhibit any regular action in producing immunity to each other a strain of yaws virus in the same way in rabbits does not always produce immunity to the same strain as demonstrated by IREGAMI, MAXTEUTEL, HERBERG. The age of the animal is also a factor as found by PEARCE and BROWN.

In man the four human experiments of LACY and SELLARDS are quoted. Four cases of yaws were treated with salvarsan. Six months later they were inoculated with yaws virus. In one a typical granuloma developed, in the others results were atypical. They were again treated with salvarsan with apparent cure and in two years time, when free of all signs and W.R. negative, they were a second time inoculated. In the same one case as before a typical granuloma developed. It is of interest to note that this case had only had the disease three months when first treated, the other three a much longer time. Although every caution must be taken in interpreting results, the fact that in late parenchymatous neurosyphilitics non-infection occurred in 5 cases using NICHOLSON'S strain of yaws virus, 10 cases with that of PEARCE and BROWN and 10 cases with virus from Sumatra, while slight takes occurred in cases of disseminated sclerosis, cannot be neglected. A strain kept in animals may of course lose pathogenicity for man but such a strain should not discriminate cases of G.P.I. Moreover inoculations of general paralytics with virus directly from a primary lesion in a disseminated sclerotic (this lesion itself induced by inoculation after one rabbit passage only) were always negative. The direct infection experiment has not been done but the authors think similar results would obtain. These experiments with G.P.I. cannot be taken to support the idea of a unity of virus but perhaps only a group reaction. The authors believe that the facts as known up to date would best be explained by postulating a group of viruses with characteristic yaws at one pole and characteristic syphilis at the other tropical or indigenous native syphilis and some variety of framboesia being some of the intermediate forms.

HUDSON (Ellis H) **Treponematoris among the Bedouin Arabs of the Syrian Desert.**—*U.S. Nav. Med. Bull.* 1928 Oct. Vol. 26 No 4 pp 817-825 [27 refs]

In an interesting paper the author gives his observations on a disease which the Arab folk call *bejel* and which they distinguish from *faranghi*, the foreign disease or syphilis with a primary sore acquired in adult life by sexual contact [The resemblance of the word *faranghi* to *farangi* the term applied to yaws in Ceylon is worthy of note]

Bejel is not considered a venereal disease there is no history of primary sore everyone admits having had the disease in childhood and no one expects to get it a second time cases are not isolated and it is said that inoculation of the children is sometimes practised. The symptoms are catarrh of nose and throat with copious discharge voice thick reddening of the tonsils palate and pharynx and may be mucous patches on the palate and about the genitals The skin eruptions are papular macular or circinate in character and there is a generalized adenopathy all the superficial glands in the body being felt hard shotty and discrete Later ulcers appear on the tonsils palate with ulcerating masses in the nose ulcers on the limbs and multiform skin eruptions. Later still a condition resembling gangosa is common and enlargement of the liver is generally present. There may be alopecia of scalp or beard keratosis of the soles of the feet ichthyotic shins and gummatous bone lesions The Kahn test is positive the lesions react to antisyphilitic remedies. There are no signs of the inherited disease *Tabs* and *G.P.I.* do not occur Having thus described the disease the author unlike his French and Syrian colleagues who universally regard the disease as syphilis prefers as others have done in the West Indies to speak only of a *treponematoris* and make no exact diagnosis He says *Bejel* is presented as a spirochaetal disease due to *Treponema pallidum* a variant of the syphilis-yaws *treponematoris* [Such a clinical picture is not unknown among other indigenous native populations and to take refuge in some such expression as above mentioned seems to the reviewer unwarranted when a simpler explanation is to hand The description of the disease is that of syphilis as a pandemic disease contracted in childhood the primary lesion passing not unnoticed but unnoted in a lowly living population among whom sores and ulcers are disregarded. Syphilis under such conditions may almost be regarded as one of the exanthemata of childhood Following the marked dermal reaction a considerable degree of immunity results and neuro-parenchymatous syphilitic lesions do not develop The symptoms described are all typically those of acquired syphilis as seen in children they have puzzled observers before who with the inherited disease in their minds when viewing children patients have found none of the well known stigmata. Yaws, in the absence of cases showing the typical secondary efflorescence does not enter into the problem.]

H. S. S

BUTLER (C. S) **Primitive Syphilis.**—*U.S. Nav. Med. Bull.* 1928. July Vol. 26 No 3 pp 553-557 With 2 figs on 1 plate.

The author is one of those who sees in yaws a kind of primitive syphilis. History he believes shows that syphilis was not a disease

imported from America but on the other hand Europe having syphylized the coastal regions of Africa then sent this untreated syphilis over in slave ships to the New World under the name of "yaws." He believes that his clinical work in Haiti confirms his view that yaws is syphilis and refers to various papers published by himself [already summarized in this *Bulletin*]

H. S. S.

CARMAN (J. A.) Bismuth in Yaws and Syphilis. a Report upon a Series of Cases controlled by Serological Tests.—*Kenya & East African Med J* 1928 Sept. & Oct Vol. 5 Nos. 6 & 7 pp 186-194 219-240 [27 refs.]

The author gives an account of the introduction of bismuth into East Africa for the treatment of yaws and syphilis and discusses the factors which in these countries have to be considered in selecting a method of treatment to be used on a large scale.

He records a number of small series (17-60) of cases of syphilis and yaws treated with various preparations of bismuth, using the Wassermann and Sigma reactions as evidence of efficiency of the treatment. His conclusions are as follow —

1 That yaws and syphilis are distinct diseases and although natives suffering from syphilis are often less seriously affected thereby than are Europeans they are not necessarily more easily cured on that account.

2 That none of the bismuth preparations discussed can be said to take the place of the synthetic arsenicals in African yaws and syphilis in spite of early optimistic reports on their efficacy. That after twelve injections of any of the three drugs [potassium sodium bismuth tartrate, precipitated metallic bismuth, sodium tetrabismuth tartrate] a large percentage of cases are left with positive serum reactions and that even novarsenobullion must be given more frequently than has been the custom if permanent cures are aimed at.

3 That potassium-sodium-bismuth tartrate and tetrabismuth tartrate cannot be relied upon to have a definite chemical composition, in consequence of which fact they are apt to give rise to severe local symptoms and that this tendency constitutes a second serious drawback to their use particularly in outpatient work.

4 Reduction in serum reactions may be expected to go on after treatment with precipitated metallic bismuth has stopped.

5 Of the three drugs the most active is tetrabismuth tartrate but the one most to be recommended is metallic bismuth for its painlessness and sustained action.

6 That it is not desirable for metallic bismuth to be administered by African dressers unless they are supervised.

[The use of bismuth preparations in the treatment of yaws was a natural corollary to its use in the treatment of syphilis in this country but while in this country in the case of syphilis it was soon shown that their proper place was as an adjunct to the arsenicals or in special cases under special conditions, in our East African colonies owing to their good initial action and cheapness they were used to the exclusion of the arsenicals in the big anti yaws campaigns that have there been started. These campaigns where mass treatment was aimed at were of the nature of uncontrolled experiments working on anything but a well established basis as previously pointed out in this *Bulletin*. The results in the present paper though they deal with very small numbers, are therefore important in regard to yaws. That the results, in regard to syphilis, would be bad is only what might have been anticipated in the light of knowledge accumulated in this country.]

H. S. S.

LANGER (Erich) Die Nebenerscheinungen bei der Wismutbehandlung der Syphilis [Side Effects of the Bismuth Treatment of Syphilis] — *Alin Woch* 1928 Mar 18 Vol. 7 No 12. pp 554-559 [Summary appears also in *Bulletin of Hygiene*]

This very long paper which will not bear condensation within the limits which are practicable in this journal, is worthy of study in the original as a fairly complete summary of the toxic effects of bismuth observed by a large number of workers. Besides the well known effects on mouth kidneys and colon all of them generally milder than from mercurial treatment are some skin disturbances. Perhaps the most important to remember are the general lassitude and the articular pains which occur in some cases. The author mentions also the local (buttock) skin necrosis in patches odd cases of which have been reported by a few workers and believed to be due to accidental entry of the remedy into an arterial twig. The author finds that the toxic effects of bismuth are generally less frequent and milder than those from mercury or salvarsan.

L. W. Harrison

PARSONS (R. P) Spinal Fluid in Tropical Syphilis.—*U.S. Nav Med Bull* 1928 Oct Vol. 26 No 4 pp 916-922.

In trying to explain the absence of tabes and general paralysis among the Haitian population where says the author syphilis is perhaps more prevalent than in any other country in the world the theory that it was due to non treatment is untenable during the last five years much treatment has been given but no cases of tabes or G P I have appeared. Again to quote the author Non-occurrence of neurosyphilis [the author in using this term does not explain whether he refers only to tabes and G P I or means to include any syphilitic affection of nervous tissue] cannot he thinks be explained on a racial immunity basis brought about by many generations of yaws infections, since there is no racial difference between the town and rural native and yet the town person contracts the venereal form and the mountain person the non venereal form of the disease. The theory that the Haitian strain of spirochaete is non neurotropic is untenable as visitors contracting syphilis in Haiti often develop paresis.

It has been held that lesions of the central nervous system do not exist in Haiti because the Haitian disease is yaws and not syphilis. But the disease as found in the cities does not differ in any way (except for the absence of tabes and paresis) from the syphilis of the United States and our accumulation of autopsy and clinical records now shows that the rural non venereal form of the disease known as yaws is capable of producing in Haitians all the lesions that syphilis can produce including those that the text books attribute to syphilis only. (The italics are the reviewer's)

The author believes therefore that at present the most logical explanation of the non-appearance of tabes and paresis in Haiti where syphilis is universal, lies in the fact that malaria is also universal in that country.

In order to try and find support for this contention (A) a group of 33 cases of typical yaws ranging in duration from one month to thirty years was examined and (B) a group of 30 typical city syphilitic cases ranging in duration from two months to thirty years was examined for comparison. Ages in A were 5-43 years, in B 21-69 years. Three of A group denied malaria and blood smears were

phagocytized Donovan bodies were obtained. The indurated area then broke down into a typical chancre and progressed until treatment was begun 87 days after the inoculation.

H. S. Stannus.

WILLMOTT (C. Brook). *Ulcerating and Sclerosing Granuloma So-called Granuloma Inguinale, with Case Reports.*—*Southern Med. J.* 1928, Oct. Vol. 21, No. 10, pp. 872-875.

While reporting 4 cases of granuloma inguinale the author points out how necessary it is to bear this disease in mind if a correct diagnosis is to be made in every case. In treatment antimony thio glycollamid gave uncertain results and he is disappointed to find that tartar emetic which continued for several weeks was supposed to be a specific, did not give good results. [British physicians have long recognized that treatment by antimony must in many cases be persisted with for many months. Exposure to X-ray before treatment he thinks is useful and in many surgical intervention and cauterization are considered warranted. One of the author's cases was treated with mercurochrome. Vaccine treatment as recommended by GOLDZIEHER and PRICK of New York is alluded to but was not given a trial.

H. S. S.

DE VOGEL (W. T.). *La lutte contre le Granuloma venereum dans la tribu des Marandinos (Nouvelle-Guinée hollandaise).* [*Measures against Granuloma Venereum in Dutch New Guinea.*]—*Bull. Soc. Path. Exot.* 1928, May 9, Vol. 21, No. 5, pp. 354-363.

An interesting report upon granuloma venereum in Dutch New Guinea where in the southern region the disease in epidemic form threatened the extinction of the Marandinos population. Following the call for help from Father VERTEXTER of the Catholic Mission, Doctors SITANALA, CXOPTUS and THIERFELDER undertook the work of organizing a campaign against this scourge. The disease was very widespread, affecting 12-15 per cent. of the population. In only a single case was spontaneous cure believed to have occurred. Any part of the body may be affected and extra-genital conditions were considered much more refractory to treatment. Spread by lymphatic channels is commonly seen, but in 38 cases generalization by the blood stream had taken place. In a single case visceral infection occurred. The pus in a liver abscess which THIERFELDER operated upon contained pure *Calymmobacterium granulomatis*. Long contact is considered necessary before infection occurs. The incubation period is about 2 weeks. In most cases death occurs from intercurrent disease following a cachexia produced by the disease. The disease appears to have been endemic for a very long time but rapid spread only appears to have occurred since greater intercommunication between villages became possible as the result of the suppression of head hunting and inter-tribal war. Once started, owing to the loose habits of the population, including wife prostitution, the disease was rapidly diffused. The campaign against the disease consisted in treatment by tartar emetic, and a complete revision of native marriage customs and housing habits.

H. S. S.

THIERFELDER (M U) *The Control of Granuloma Venereum among the Marindines in Dutch South-New-Guinea.*—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1928 Vol. 17 Pt. 2. pp. 393-423 With 10 figs on 7 plates & 4 maps

In this *Bulletin* Vol. 25 p. 668 there appeared a summary of a paper by DE VOGEL upon the subject now dealt with by Professor Thierfelder in greater detail. The author gives an interesting ethnological survey of the people among whom he was working to show the part native custom may play in the propagation of a disease and the method of carrying out the campaign against G.V. is fully dealt with. The essential points have however been covered in the previous summary.

H. S. S.

GILDBERG (Gustav) *Lymfadenitis ingvinalis granulomatosa subacuta (Lymfogranulomatosis ingvinalis subacuta benigna—Nicolau og Favre's syndrom)* [*Granuloma Inguinale.*]—*Norsk Mag. f. Lægevidenskaben* 1928 Aug Vol. 89 No. 8 pp. 762-775 [26 refs.] (German summary p. 776)

The author reports a typical case of granuloma inguinale in a 26 year old seaman who 14 days before the development of the bubo showed a small spontaneously healing lesion of the glans. The case was treated in the Oslo hospital and is discussed at length with pathological findings for the benefit of his Norwegian colleagues.

H. S. Stannus

CLIMATIC BUBO

ARAUJO (Oscar da Silva) O azul de metyleno na lymphogranulomatose inguinal subaguda. [Methylene-Blue in the Treatment of Subacute Inguinal Lymphogranulomatosis].—*Ann. Brasileiros Dermat. e Syph.* 1928 Jan.-Mar Vol. 4 No. 1 pp 16-20

The first patient, a man of 27 years had had a swelling of the glands of the left groin for 6 months. When seen at the end of that time the mass was discharging by several sinuses. W. R. negative. There was no constitutional disturbance then, but history of previous headache, loss of appetite, general malaise and rheumatic pains. At first "814" was given without any benefit. Potassium iodide to the limit of tolerance was also ineffectual. Intra-eneous injection of methylene-blue, 5-10 cgm. daily in 1 per cent solution, was followed by marked improvement in a fortnight, and the patient went away cured in a month. There was no general reaction and there had been no relapse when the patient was seen later (how long after is not stated).

A second, ery refractory case of old-standing after a little improvement did not clear up further though the initial 5 cgm. daily dose was increased to 10 and later to 15 cgm.

A third reacted strongly—showing rise of temperature, articular pains and severe prostration—to the first dose of 5 cgm. The dose was therefore reduced to half and then rapidly increased till 10 cgm. were given for a month without disturbance. Improvement set in, as in the first case, after a fortnight and he was cured by the end of the month. This last patient had also an application of iodine in the form of iodox, locally rubbed in.

H. Harold Scott.

HILLMAN (John A.) WILSBURY (H. F.) & ZIMMERMAN (H. M.) Lymphogranulomatosis inguinalis. Report of a Case of Twenty Months Duration, with Autopsy Observations.—*Arch. Dermat. & Syph.* 1928. Sept. Vol. 18. No. 3 pp. 383-392. With 7 figs. [21 refs.] [New Haven Hosp. & School of Med., Yale Univ., New Haven, Conn.]

The report of a case unsuccessfully treated of what in the absence of a more positive etiology is considered to be climatic bubo or lymphogranulomatosis inguinalis with pathological findings.

H. S. S.

WILMORE (Clifford Lee) Subacute Inguinal Lymphogranulomatosis. Report of Thirty Cases.—*Jl. Trop. Med. & Hyg.* 1928. July 2. Vol. 31. No. 13 pp 153-156. With 1 text fig. [8 refs.]

This paper is practically a recapitulation of one appearing in an American periodical summarized in this Bulletin, Vol. 25 p. 665.

H. S. S.

SLEEPING SICKNESS

LEAGUE OF NATIONS. Health Organisation. Report of the Second International Conference on Sleeping Sickness. C 563 6 pp 1928. Nov 21 Geneva.

This Conference was held in Paris from November 5th to 7th 1928 to consider the final report of the International Sleeping Sickness Commission and questions arising therefrom. Delegations from Belgium, France Great Britain Italy Portugal and Spain attended. Two Sub-commissions were formed one to deal with administrative measures and the other with research. The Conference did not recommend at present the creation of another International Commission of Research but it elaborated a programme of further research and investigation which in its opinion should be carried out in the different national laboratories in countries in which diseases transmitted by tsetse prevail. The programme is as follows —

A RESEARCH

The Conference recommended that a further study be carried out in different national laboratories of countries in which diseases transmitted by tsetse flies prevail on the problems enumerated below

1 The questions of natural immunity spontaneous cure and of acquired immunity of man should be further studied. For this purpose the experimental infection of volunteers would be of value. Experiments on ruminants that are relatively resistant are also recommended these after recovery should be exposed to the bites of tsetse flies

2 The question of the natural immunity of *Cynocephalus* and of *Cercopithecus* (mangabeys) should be followed up. An attempt should be made to overcome this immunity and to establish its relationship with the serum resistance of trypanosomes. This would throw light on the possibility of man becoming infected with animal trypanosomiasis

3 The natural reservoir of *T. gambiense* appears to be limited to man, but it is still necessary to look for other reservoirs. Such an investigation should be directed towards the discovery of new means of diagnosis. The Conference directs special attention to the observations made by Dr Peruzzi relating to the presence of trypanosomes in serous cavities

4 The question of the origin of *T. rhodesiense* and, in particular its relationship to *T. gambiense* and *T. brucei* has not yet been settled and calls for further investigation

5 Are all the characteristics acquired by trypanosomes preserved during their cyclic evolution in the body of the tsetse (resistance to therapeutic remedies exalted virulence high transmissibility index etc) ?

6 The evolution of different polymorphic trypanosomes in the body of the tsetse chiefly those which naturally infect domestic animals and game in areas in which *G. morsitans* is prevalent. Investigation of the factors of environment, climatic or other on the cyclic transmissibility and pathogenicity of polymorphic trypanosomes by glossinæ

7 Anatomopathological investigations — It would be of the greatest interest to verify in man the anatomopathological findings of Peruzzi in monkeys chiefly in so far as lesions of the myocardium of the brain and of the serous membranes are concerned. The comparative pathological anatomy of trypanosomiasis of cattle and wild animals should be carried out at the same time. For this investigation, use should be made of monkeys animals suitable for this purpose

8 Biological studies of tsetse flies should be carried out concurrently with epidemiological and epizootic investigations and each should be carried out, preferably by specialists on similar lines in *T. rhodesiense* *T. gambiense* and *T. brucei* areas respectively

"9 The most important factor in determining the infectivity of a trypanosome being its faculty of cyclic transmission, its evolution should be followed in individual subjects throughout the course of their infection. It should be determined whether the infectivity is liable to increase, decrease or disappear altogether whether the cyclic transmissibility may after a latent period, develop anew in chronic cases, and under what conditions it may disappear altogether. A knowledge of such conditions might lead to an effective method of prevention.

"10 A study of the nature of the blood ingested by tsetse flies in game areas where *G. moraxi* prevails should be pursued with the object of ascertaining the rôle of animals in the biology of glossinæ with special attention to such animals as may act as reservoirs of the virus. For this purpose the morphological examination of the ingested blood, supplemented where necessary by the precipitation of some similar test, might be employed. It is important, therefore, to study the relative value of such tests and the conditions which limit their applicability.

"The part played by the hippopotamus as a reservoir of the virus calls for further study this can best be done by the experimental infection of young animals with infected flies.

"11 Morphological studies should be extended to all members of the polymorphic trypanosome group more especially to trypanosomes of the type *brucei* where *papalis* prevails and to trypanosomes of the *peccati* type in *papalis longipalpis* *lacksoides* and *moraxi* regions.

"12 Therapeutic researches are of the highest importance. Chemiotherapy is at the present time the soundest basis for preventive measures in the central regions of tropical Africa. Investigations into the curative effects of trypanamide, trypanaryl Fournieu 270 etc., should be continued. It is to be hoped that other still more effective, and at the same time cheaper substances may be discovered, and, if possible substances which would be effective when administered by mouth. Moranyl (Bayer 203 or Fournieu 309) would appear to be in a separate category in that they afford protection over a long period they should be employed for the protection of healthy individuals, at the same time as the sterilisation of the blood of patients is being carried out by the judicious use of atoxyl or of the other remedies mentioned above.

B CO-ORDINATION OF TRYPANOSOMIASIS INVESTIGATIONS.

"The Conference considered that the Health Organisation of the League of Nations might render useful service by keeping the workers in the different national laboratories in touch with one another for which purpose the following recommendations are made

"1 Laboratories and research centres in Africa which are engaged in research work on trypanosomiasis might find it useful to communicate to a small expert committee appointed by the Health Organisation for the purpose say once a year an account of the work done together with publications. This Committee would in its turn from time to time circulate, and where necessary translate the collected papers with a short general review of the progress made in trypanosomiasis research and prevention, to the institutes and centres referred to as well as to interested administrations.

"2 To encourage the co-operation of the different institutes in such a scheme, the Committee referred to might be empowered to make recommendations to the Health Committee, say once a year for the award to one or other of these institutes of a *bourse individuelle* which would enable a member of its staff to visit some other country or countries where work of special interest to the laboratory selected is being carried out.

"3 In view of the considerable differences that characterise the trypanosomiasis in different localities, the Conference recommended individual "interchanges," which would enable research workers in African laboratories to become acquainted with trypanosomiasis investigations being carried out in other laboratories."

The Conference also considered the general recommendations for the control of sleeping sickness in African Dependencies contained in the Final Report of the International Commission on sleeping sickness (this *Bulletin* Vol. 25 p 781) and recommended their adoption in the following form —

Among the measures which may be recommended to Governments for application in the light of local circumstances and where measures of strict control are necessary or possible it is agreed to propose the following

- (i) Control over the movement of natives This implies
 - (a) Enumeration of natives carried out by the administrative authorities
 - (b) Adoption of an identity book, card etc for each native containing particulars as to health, which could serve as a medical passport
 - (c) Delimitation of areas for entry into and departure from which a medical authorisation will be obligatory
 - (d) Close co-operation between medical and administrative authorities—without which any prophylactic measures would be ineffective—and in special cases the conferment of police powers on medical officers
 - (e) The establishment of observation posts for medical examination and medical control of natives
- (ii) Control and treatment of infected natives both of which should be as complete as possible to ensure this there are required
 - (a) An adequate medical personnel
 - (b) Powers to enforce the medical examination and treatment of natives
 - (c) In case of necessity the power of withdrawal of the medical authorisation at travel.
- (iii) Clearings effectively maintained at watering places, around villages and at river crossings
- (iv) When the local administration considers this measure indispensable the evacuation of heavily infected zones and the establishment of the population in a more favourable situation in the vicinity

A Draft International Agreement for the campaign against sleeping sickness was presented by the Belgian delegation this is given in an Appendix to the Report The Conference considered that a general agreement between the States would be difficult to achieve at present in view of varying local conditions.

The Conference also considered that the Health Organisation of the League of Nations could usefully add to the service it has already rendered by collecting and analysing the facts obtainable in regard to the incidence of human trypanosomiasis, its relative importance in relation to other causes of morbidity and the results of the different measures medical and administrative which are taken to combat the disease in different parts of Africa.

W Yorke

CARPENTER (G D Hale) *Annual Report on Sleeping Sickness for 1927—Uganda Protectorate Ann Med & San Rep for Year ended 31st December 1927 Appendix No II pp 66-75*

An account is given of the present state of affairs in each of the proclaimed sleeping sickness areas

Victoria Nyanza Area. Control of this area has been greatly facilitated by arrangements under which an Assistant District Commissioner in the Entebbe, Masaka, and Mengo districts is charged primarily with the control of sleeping sickness in his part of the area Later an

Assistant District Commissioner was appointed in the Eastern Province for the control of all the sleeping sickness areas in the Province.

Apart from an outbreak of sleeping sickness at the head of Murchison Bay there has been an orderly progress of reclamation in the Mengo district, which has been quite ideal in its procedure. The District Commissioner on receiving applications from natives to be allowed to return to certain places has first considered whether it is administratively desirable and whether there are enough applicants to form a strong colony. The Inspector then examined the area and furnished a report from which it was then possible to give a decision.

In Busoga there has been no development of the coast land, except for the exploitation of two large forestry concessions. At Jinja steady progress has been made with reclamation of Kerinya peninsula, which can now be considered safe but the bank of the Nile is still very dangerous below the Owen Falls. The dispensary at Lumino has continued to treat cases of sleeping sickness not only in Uganda, but among natives from the Kenya side of the border. No case of sleeping sickness has been discovered among the inhabitants of the Sese and Buvuma Islands, and no cases have been found among the fishermen, except in the endemic area around the Mjanji.

In the previous report it was mentioned that four cases of sleeping sickness had been discovered at the head of Murchison Bay near Port Bell. It was not then possible to decide whether the local *palpalis* were to be regarded as infected. Subsequent events, however dispelled this doubt, and it became evident that immediate action was necessary. Recommendations were made that all wood-cutting in the area should be stopped, the irregular penetration which had been going on for several years should be checked and regularized, and all persons owning land along the lake shore should be compelled to clear their own section of the shore for one hundred yards back from the water. The whole population was repeatedly inspected, and the number of cases detected is fourteen. As a result of the action taken, it has been hoped that the local outbreak has been checked.

The state of affairs in the *Victoria Nile area* is still unknown. The *Alpologoma area* has been reported upon by Dr. van Hoof of the League of Nations Commission, as also has the *Basiloma area*. The *Siroko area* has not been examined since 1925. In the *Kates area* the portion in Toro district was toured by Carpenter in December. It was found necessary to increase the size of the proclaimed areas so as to embrace the upper parts of several rivers, which have been shown to be infested with fly. On one of them two cases of sleeping sickness had been detected by a native dispenser. No cases were found at Katwe itself, at hasenyi, or at Katunguru. The *Wasa River area* and the *Buwaba areas* have not been re-visited. The question is under consideration whether a fishing industry can be allowed in the *Buganda Lake Albert area*. The *Banyoro area* was not visited. The boundary requires re-defining, as it includes much country that could now be safely opened for habitation, and the important Budongo forest is now probably fly-free.

As regards the *Nile area* the part in the West Nile district shows no deaths from sleeping sickness, but it is probable that deaths are concealed. Conditions at the Railway fuel camp were unsatisfactory. The population of Junam county along the Nile was examined and seven definite cases of sleeping sickness were seen and seven other possible cases in which trypanosomes were not seen. Migrations into the West Nile district from Madi have unfortunately continued on a

somewhat large scale. Until October there was no Medical Officer in Gulu, and the author has been unable to examine the area. Returns of death from sleeping sickness were made quarterly by the chiefs and are shown in tables. In the Acholi area nearly all the deaths were recorded from keyo the others being in Attiak. The native returns of death from sleeping sickness in the Madi area of the Gulu district are also given in tables. The sudden rise in the cases of 1926 and early in 1927 is not reflected in the death returns which show the efficacy of the methods adopted. There was no Medical Officer in the Chua district and Carpenter was not able to visit it. One case of sleeping sickness was discovered by the Sub-Assistant Surgeon.

The treatment of all cases has been by tryparsamide except for a temporary shortage of the drug early in the year. This drug produces effects of a nature quickly appreciated by the natives themselves. There are several records of cases in Madi where an astonishingly good effect was produced which lasted for several months even when there were signs of involvement of the central nervous system. W Y

KOPKE (Ayres) Estudos executados pela missão médica em Moçambique e proposta para a ampliação do laboratório central do hospital Miguel Bombarda de Lourenço Marques transformando-o no instituto de investigação médica. [Work of the Medical Mission in Mozambique.]—*Jl Soc d Sciéncias Méd de Lisboa* 1923 Sept. Vol. 82. 56 pp

This long article contains much that is already well known as regards the history of sleeping sickness and the discovery of various trypanosomes the discussions which have taken place and the views held as to the identity or otherwise of *gambiense*, *rhodesiense*, *brucei* etc. and quotes considerably from the work done at Entebbe. The route taken and the investigations carried out by the Portuguese mission in Mozambique are described. While examining the blood for trypanosomes opportunity was taken to note also the presence of other parasites—*Piroplasma*, *Halteridium*, *Leucocytotoxon*, *Plasmodium* and filarial embryos.

In bovines trypanosomes of the *congolensis* or of the *virax* type were seen but not both together in the same animal. In some regions tsetes were not found but other blood-sucking flies in considerable numbers. *Stomoxys*, *Haematopota*, *Tabanidae* etc.

A comprehensive scheme of work is proposed of which the following is a résumé.

1. Investigations in the properties held by the Nasa Company to determine foci of endemicity.
2. At the same time to map out the distribution of the various species of *Glossina* and by dissection to find out the percentage infected.
3. Inoculation of animals especially *Cynocephalus*, *Cercopithecus* and dogs by means of recently caught flies.
4. To take blood-smears to determine infection by various protozoal parasites and send specimens to the central laboratory.

Questions of personnel, staff pay and permanency of tenure are all spoken of and the establishment of concentration camps and local laboratories in endemic areas considered. A very important proposal is the collaboration between workers in human and animal trypanosomiasis. In the south of the province an intensive study is projected in those districts where animal trypanosomiasis exists in the absence or with extreme scarcity of tsetse flies.

In its original state or when this article was first communicated, maps were shown. It is a pity that such were not included in the reprint in order that the route taken by the Mission might be more closely followed.

H. Harold Scott.

SPREUDEL. Die französische Schlafkrankheitsbekämpfung [The French Fight against Sleeping Sickness].—*Munch Med Woch* 1928. Sept 28. Vol. 75 No 39 pp 1684-1686

This article is a criticism of the French attempts to deal with sleeping sickness, particularly in the Cameroons by wholesale atoxylation of the infected.

W 3

HÉRIEAUX. Un foyer épidémique de trypanosomiase humaine au Togo. [An Epidemic Focus of Human Trypanosomiasis in Togoland. —*Ann de Méd et de Pharm Colon* 1928. Apr-May-June Vol. 26. No 2 pp. 127-141 [Refs. in footnotes.]

The paper commences with a historical review of sleeping sickness in Togoland, where the disease has been known to exist since about 1850. Passing to a consideration of the epidemic sector the author points out that the Bina river forms its axis. The author has followed its terminal course from the Dahomey village of Tchélengada situated 6 kilometres over the frontier to its confluence with the Keran, a large branch of the Koumongou. In this course of 50 kilometres, the name of the river varies with the different peoples inhabiting its banks. A description is given of the country through which it flows.

The centre of the epidemic is the Lama Tessi, which comprises three-fourths of the cases. It is in the villages of this canton that the greatest density of the disease is found. The Lama-Tessi is one of the most important of the dozen countries into which the Cabrais country is divided. Apart from Kodjéné it constitutes with its 17 000 inhabitants the most highly populated district. It occupies about 230 square kilometres.

A description is next given of the organization of prophylactic activities which were put in charge of LETOURNIER, when the epidemic was proclaimed in January 1927. In the following table the result of examining 21,863 individuals is summarized —

Sexes and Ages	No examined.	Suspects	Trypanosomes (Microscopic diagnosis)	Index of disease Percentage.
Boys under 12	4 807	1 282	164	3.41
Girls under 12	4,305	911	78	1.76
Youths between 12 and 20	1 001	377	72	7.19
Maids between 12 and 20	341	108	13	3.81
Young men between 20 and 40	3 846	1 422	308	10.08
Young women between 20 and 40	4 151	1 091	237	5.70
Men of 40 and upwards	1 694	358	82	5.43
Women of 40 and upwards	1 623	279	42	2.58
Total	21 863	5 778	1 064	

Atoxyl was the drug mainly used. trypanamide is without doubt more efficacious in the nervous stage of the disease but the fact that it had to be given intravenously restricted its employment. Atoxyl was given in large and frequently repeated doses. The average dose used was 90 to 95 cgm. in women and 120 to 125 cgm. in men. seven such injections were given at intervals of 16 to 18 days. It is still too early to judge of the results.

The disease is due to *T. gambiense* and the infection is spread by *G. palpalis*. The author points out that game does not exist in Lama Tessi, and that the inhabitants of the infected district are robust and well nourished.

W Y

FOURCHE (J. A.) Relation sur le fonctionnement de la mission autonome de prophylaxie contre la maladie du sommeil au Kasai. [The Work of the Prophylactic Mission against Sleeping Sickness in Kasai].—*Ann Soc Belge de Méd Trop* 1928. Sept. Vol. 8. No. 2. pp. 169-184

In this paper an account is given of the work done against sleeping sickness in Kasai. The geography of the district and the characters of the inhabitants are described and the general distribution of sleeping sickness is indicated. During 1926 145 050 people were examined and 3,216 cases of sleeping sickness recognized and in 1927 235 795 were examined, and 6 432 found to be infected. The disease thus flourishes in the whole of the portion of Kasai examined its intensity however is very variable oscillating between 1 per cent in certain zones and 10 per cent in others and in certain isolated places it is even greater than 10 per cent. A rough indication of the distribution of the disease in the district is given. Of the therapeutic and prophylactic results obtained, the author points out that during 1926 the 3 216 cases discovered to be infected and 7 613 doubtful cases were treated in 1927 the 6 432 infected cases and 9 657 doubtful cases were treated.

In a table the information obtained in the various districts during 1926 and 1927 is summarized. This table shows the number of people examined in each district the number infected, the gross percentage of sick (new patients + old patients, whatever their state) and the net percentage (old patients still infected + new patients) the difference gives the measure of the therapeutic results in the second and subsequent examinations. The number of doubtful cases is also recorded.

Observations were made on the prophylactic action of Bayer 205. In 1926 one or two injections of the drug were given to 3 101 healthy persons living in heavily infected (10 per cent) zones. Of these 1 681 were re-visited after 7 or 10 months and 772 were again seen after 15 months. This work is the subject of a special paper [see FOURCHE and RICKLIN below] and the author contents himself here with merely remarking that the method is very efficient.

W Y

BAKUNIN (LOUIS) Rapport sur les travaux accomplis au Mayumbe par la mission médicale pour la lutte contre la maladie du sommeil dans le district du Bas-Congo (Mai 1925-Mars 1926) [Work done at Mayumbe, Lower Congo, of the Sleeping Sickness Mission].—*Arch Ital Sci Méd Colon* 1927 June Vol. 8 No. 6. pp. 312-326

Before giving an account of the work of the mission under his direction, the author considers it necessary to refer briefly to the history of

previous sleeping sickness work in the region of Mayumbe. In 1921 this district was divided for sleeping sickness purposes into two great zones, that of Lukula and that of Tshela. The first examination of Lukula commenced in 1920 but for various reasons the figures obtained are of little real value. Later investigations made in July 1921 showed that of 16,302 persons examined, 5.17 per cent. had trypanosomiasis. Tshela was examined for the first time in May 1921 and of 3,409 persons examined, 4.5 per cent. were infected, and of 2,339 who were labourers, 3 per cent. RODRIEX in his tour of inspection the same year examined 3,105 patients, and 4.3 per cent. were found to be infected.

Nothing was done during 1922, but between February 1923 and March 1924 MARUGO examined the whole population of Mayumbe with a result that he found 7,280 cases (4,399 new and 2,881 old) amongst the 145,204 natives examined, i.e. about 5 per cent. The author draws attention to the fact that, since this figure is based on a much larger population and on a much larger territory it is much more important than the preceding figures.

Bakurum was appointed in charge of the mission in May 1925. The constitution of the mission is stated. Its objects can be summarized as follows —

1. Census of the population and examination of the natives from the point of view of trypanosomiasis.
2. Provision of the healthy natives with medical passports, and the replacing of those in bad condition.
3. The furnishing of the infected natives with a treatment tally and completing those of the old cases describing their treatment and the results.
4. Lumbar puncture of old patients, who had received two complete series of therapeutic injections.
5. Reorganization of the treatment centres.
6. The mission was also entrusted with the distribution to the natives of an anti-dysenteric vaccine prepared at the Leopoldville laboratory. It is remarked that the distribution of this vaccine and its results is the subject of a report that has already been furnished.

The result of examination of the whole population is summarized in the following table —

	Men.	Women	Boys.	Girls	Infants.	Total.
Examinations	34,821	42,601	22,875	22,312	14,616	137,225
Punctures	13,064	15,127	10,554	9,229	1,406	49,390
Trypanosomes new	933	1,600	747	571	9	3,860
Trypanosomes old	1,785	2,480	1,088	796	—	6,139
Percentage New cases	2.8	3.9	3.4	2.6	0.06	2.8
Percentage Old cases.	5	5.8	4.7	3.5	—	4.4
Percentage Total	7.8	9.7	8.1	6.1	0.06	7.2
Deaths	208	217	94	39	—	558 = 0.4%

Lumbar punctures 2,433—normal fluid 1,813 74 per cent.—altered fluid 620 26 per cent.

Change of residence 401

Refractory absent, or unknown 681

After commenting on these figures the author reaches the conclusion that the disease is still progressing in the district. Many difficulties attend sleeping sickness work here. The villages are widely distributed

in a country which is mountainous and covered with forest. The chiefs have little authority. The distances are so great that it is impossible to keep watch on the native assistants. It is difficult to identify the natives and consequently the refractory patients often escape observation. Finally there is lack of good feeling towards the Medical Service not only by certain chiefs but also by some white residents. The paper ends with a list of recommendations for dealing with the situation.

W Y

BAKUNIN (Luigi). La lotta contro la malattia del sonno (trypanosomiasi) nel Congo Belga. [The Sleeping-Sickness Campaign in the Belgian Congo]—*Arch Ital Sci Med Colon* 1928 July Vol. 9 No 7 pp 407-414

This is an interesting paper though the latter part only is concerned with the subject of the title. The earlier part is a brief historical note on trypanosomiasis in general followed by a sketch of the symptoms diagnosis and treatment. The rarity of the presence of the trypanosome in the spinal fluid is shown by the fact that among 2 433 individuals on whom lumbar puncture was performed the parasite was found in the fluid on three occasions only.

In the Belgian Congo there are not counting efforts of minor importance four medical missions doing work on a large scale at Basse-Congo Kuango Equatore and Uelé. The methods employed seem to savour too much of compulsion to find favour among British workers. Thus the districts are combed for patients when after a long and difficult search it is possible to lay hold of them, they are shut up in proper lazarettes and subjected to the necessary treatment and released only when cure has been attained. Every individual of any age and either sex is examined and any found positive is immediately given an intravenous injection of the selected drug. Each district is under the charge of a Sanitary Agent with a certain number of native assistants trained to carry out laboratory examinations for parasites and to give intravenous injections. A list of all the patients is kept and each is injected weekly for 3 months, the course being repeated after an interval of the same length. After a time the medical officer pays another visit searches for fresh cases, examines those under treatment and decides whether they may be left for six or twelve months or are to be retained for a fresh course.

Towards the end of the paper the author makes the following remark which will find an echo in the hearts of all conscientious workers in tropical zones. In Europe far too little is realized of the vast amount of work performed by colonial medical officers in equatorial regions in waging war against the many parasitic diseases which prevail, and in particular against trypanosomiasis.

H Harold Scott

FOURCHE (J. A.) & RICKLIN (J). Expérimentation du Bayer 205 au point de vue préventif dans la pratique itinérante. [Prophylactic Administration of Bayer 205 in Itinerant Practice.]—*Ann Soc. Belge de Méd Trop* 1928 Sept. Vol. 8 No 2 pp 143-160

In this work, the authors set themselves to ascertain whether Bayer 205 given to healthy persons residing in heavily infected

regions had any prophylactic action and, if so what is its duration? Their procedure was as follows —

- 1 Heavily infected centres were chosen.
- 2 The drug was given only to non-infected persons.
- 3 Specific treatment (atoxyl or tryparsamide) was given to infected and to doubtful cases.
- 4 Re-examination of the centres after a certain time and determination of the percentage of new infection among the Bayerized persons (index of contamination)
- 5 The Kasai, and particularly the regions of the Lulua and Dibaya provided the necessary centres of heavy infection. Their first examination, and the Bayer injections, were made between June 1928 and May 1927.

Details regarding the number of persons examined, the number injected, and so forth, are given in a series of tables.

At the first examination Centre 1 M'Bawo-Tshibi, 12 to 18 per cent. were infected. Centre 2, Tshimbabanga-Tshimama, 15 to 23 per cent. Centre 3 Kateba, 7.8 per cent. Centre 4 Lukusa, 5 per cent. Centre 5 Tshimbabungu, 10 per cent. Centre 6 Kamango-Kalonji Kasua, 10 to 20 per cent. and Centre 7 Kasadi-M'Baye-Kabemba, 10 per cent.

Diagnosis in the majority of cases was based on microscopical examination, but in a few—old cases—the diagnosis was clinical. All the infected and all the doubtful cases were set on one side and Bayer 205 was given only to the healthy. Furthermore, the old and debilitated, those suffering from febrile disturbances and women who had passed the sixth month of pregnancy were also excluded. For political reasons the authors also abstained from injecting those healthy persons who objected; these, however, were comparatively rare. The drug was given intravenously in a dose of 1 gm. to a healthy adult and from 0.3 to 0.75 gm. to children and adolescents. A few sucklings received 0.15 to 0.2 gm. The majority of the patients were given two injections, the second being administered 15 to 30 days after the first. In the period mentioned, 5 141 [5 143 ?] injections of Bayer were given as follows: 1 069 persons had a single injection, and 2 042 had two injections. Apart from certain slight symptoms, the injections were well tolerated; only a single death occurred, from cardiac syncope. Parallel with these, in all the centres in question the infected received six massive injections, either 1 gm. of atoxyl, or of 2 gm. tryparsamide spaced at intervals of not more than a week. The same treatment was also given to the doubtful cases, that is to those who had typical glands which were negative on puncture.

In the re-examinations the same technique was followed as in the first examination, except that in those who had Bayer and showed typical glands several punctures were made. In all it was hoped to re-examine 2,185 Bayerized persons in Centres 1 2 3 5 and 6. Centre 4 was excluded from the re-examination, because the initial number (5 per cent.) of infected was too small to allow of any conclusion, and Centre 7 and certain of the cases in Centres 1 and 5 because they were too recently treated with the drug. As a matter of fact it was found possible to examine only 1 681 that is 77 per cent. of the above number owing to the movements of the population resulting from the industrial activity of the district. These 1 681 persons re-examined comprise 429 Bayerized seven months previously and 1,252 Bayerized ten months previously. The results of the examination are set forth in detail in a table, from which it is seen that the index of contamination

is nil amongst those who have received two injections of Bayer seven months previously. The index of contamination is very small in those Bayerized ten months previously, and it was smaller among those who had two injections than among those who had only one. As a result of this portion of their work, the authors conclude (1) that Bayer 205 given to healthy persons in one or two doses exerts a really strong preventive action against infection with *T. gambiense* (2) that the preventive action is fully efficient for seven months after two injections and (3) that it is marked up to ten months especially in those who had two injections.

The authors point out however that the treatment of atoxyl or tryparsamide given to the infected and doubtful cases doubtless afforded protection to non-infected cases by reducing the risk of infection and this fact must be taken into consideration in judging the effect of prophylactic administration of Bayer 205.

The next part of the work consists of a consideration of the parts played by these two factors in the protection of the population. The point could easily be settled if one could abstain from treating the sick in two areas equally infected, and give prophylactic Bayer to the healthy in one of the areas and nothing to the healthy in the other. This comparison however they were unable to make and the authors had to content themselves with contrasting the results obtained in the Bayerized healthy with the untreated healthy in districts in which the sick and the doubtful had been treated with arsenicals. The number of healthy not Bayerized was small, except in the Tshumbalanga centre and the Kateba group and at Mwamba Gufulu. The number of infected found in these three places at the first examination was respectively 13 per cent, 10 per cent and 9 per cent. The sick and doubtful cases in these places had been treated with arsenicals and the centres were re-examined in precisely the same way. The index contamination among the healthy non Bayerized (1 889 persons) was after 10 months, found to be 1 per cent. This relatively small infection rate shows the prophylactic benefit resulting from treating the sick.

In the following table a comparison is given of the indices of infection amongst the Bayerized and non Bayerized.

Healthy	Delay in re-examination Months	Index of contamination Percentage	Percentage of infection at the 1st examination
Bayerized (nearly all 2 injections)	7	0.00	18
Bayerized (2 injections)	10	0.22	13
Bayerized (1 injection)	10	0.54	13
Non-Bayerized	10	1.00	10

This table shows a definite difference in the index of contamination amongst people examined after 10 months according to whether or not they previously received Bayer 205. The general conclusion is that although treating the sick and doubtful cases with arsenicals was in part responsible for the low infection rate found in the second examination, nevertheless prophylactic treatment with Bayer had a very definite influence.

MAYER (Martin) Die Behandlung und Prophylaxe der afrikanischen Schlafkrankheit mit Germanin ("Bayer 205") Kritische Besprechung der bisherigen Ergebnisse und Vorschläge. [The Treatment and Prophylaxis of African Sleeping Sickness with Germanin. Critical Review.—*Arch f. Schiffs- u. Trop. Hyg.* 1928. Oct. Vol. 32. No. 10. pp. 528-542. [44 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

In this review the author summarizes a large number of the observations which have been made by various workers with germanin, and then passes to certain general conclusions.

With regard to dosage he points out that the usual amount given in a day is 1 gm. but that amounts up to 2 gm. have been administered from time to time without harm. The drug is best given intravenously but in case of necessity it can be given intramuscularly. Turning to the frequency and number of doses Mayer states that it is quite astonishing how without any apparent reason the interpolation of long intervals has not only been retained, but has become the procedure of choice. He summarizes the various schemes of dosage adopted by a considerable number of workers. Mayer states that he adheres to his original view that the best method is 3 to 4 injections of 1 gm. each in the shortest possible space of time. That a total amount of 4 gm. on successive days can be given appears certain. If the dose of choice is 1.5 gm. it can be given on the first, second and fourth days. 2 gm. doses should be given on alternate days. If a total dosage of 4 to 5 gm., given as quickly as possible is without action, it is of no use repeating the course of treatment the following week or month. It has been found that on occasion trypanosomes may re-appear in the blood some time after the administration of germanin and remain even for some weeks only to disappear again without further treatment. All experience shows that misplaced and insufficient dosage only results in the production of drug-fast strains.

As additional remedies the author recommends in early stages an antimony cure (neostibosan) eight days after the course of germanin. Of the arsenic preparations, he considers atoxyl to be best. In the later stages, trypanamide is to be recommended, but it is not of much use in *T. rhodesiense* infections.

As a prophylactic for mass use among natives, Mayer advises 1 gm. given intravenously and repeated each three months. In Europeans he recommends the same except that the initial dose should be 2 gm. For sterilization of the blood of advanced cases a three-monthly injection of 1 gm. is advised.

W Y

LEDENTU (G) Ob en sont le traitement et la prophylaxie de la maladie du sommeil? [The Position of Treatment and Prophylaxis of Sleeping Sickness.—*Ann. de Méd. et de Pharm. Colon.* 1928. Apr.-May-June. Vol. 28. No. 2. pp. 188-210.]

The important chemotherapeutic discoveries of late years have completely transformed the outlook of the treatment and prophylaxis of sleeping sickness. In trypanamide and Fournier's Z70 we have powerful trypanocidal remedies which enable us to save a very large

number of apparently hopelessly infected persons and the discovery of moranyl [Fournieu 309 probably identical with Bayer 205] permits us to hope that we have a prophylactic agent by which thanks to its preventive properties, it will be possible to exterminate rapidly the large epidemic foci which still persist in numbers and constitute a permanent danger to surrounding districts.

The author's object in this paper is to indicate what new organization in the campaign against sleeping sickness should coincide with the introduction of the new drugs. He first of all summarizes the results obtained by various authors with these different drugs and then passes on to a consideration of the organization of an anti trypanosomiasis campaign. Prophylaxis and therapy should go on together but they are two distinct tasks and necessitate two distinct organizations. The era of the itinerant physician hunting out the patients and confiding to subordinates the care of their treatment must be closed for it no longer meets the necessity of the case. The new drugs render possible a great number of cures but they require delicate handling they must be adapted to the individual cases they demand precise diagnosis and attentive supervision which can only be obtained in dispensaries specially devised for the purpose. Thanks to moranyl one sees the time approach when new infections will be reduced to a minimum but its application to the entire population is a lengthy affair and requires scrupulous exactitude and strict control.

W Y

VAN DEN BRANDEN (F) La première croisière médicale du bateau hôpital Belgique [The First Medical Cruise of the Hospital Ship "Belgique."]-*Ann Soc Belge de Méd Trop* 1928 Sept Vol. 8. No 2. pp 121-142.

Thanks to the initiative of the Governor and of Madame Maurice Lappens the Belgian Congo has been provided with a fully equipped hospital ship. This ship makes it possible for the medical service to examine and treat rapidly a large number of natives and to render aid to Europeans far removed from medical centres. The first cruise which lasted 4 weeks was under the direction of Van den Branden and comprised the stretch of river between Leopoldville and Kwamouth. The principal object was the study of sleeping sickness and to determine the most practicable method of combating the disease.

After a brief account of the results of previous work in this region the author gives information regarding the number of men women and children examined and of those found to be infected in each of the 52 posts visited. He points out that but for the ship this work would have taken several months. In all, 3 778 natives were examined in the 52 villages 168 new cases of trypanosomiasis were discovered and 620 cases were found to be undergoing treatment. The total infected was therefore 788 (20.8 per cent).

All the cases were given one injection of trypanarsil and one of Bayer 205. In addition, 50 injections of Bayer 205 were given to cases sent for the purpose from the Tua region. Bayer 205 was also administered prophylactically in three heavily infected regions.

During the voyage one European was found to be infected.

Regarding the organization of the campaign against sleeping sickness in the Kimpolo-Kwamouth stretch Van den Branden states that the

treatment of all the cases, both new and old, will be continued by native assistants, the region being for this purpose subdivided into five districts.

Other activities which occupied the author's attention during the trip were the vaccination of 2,477 natives, the diagnosis and treatment of 88 cases of yaws, and the determination of the helminthic and malarial indices in three native agglomerations.

W Y

VAN DEN BRANDEW (F) Le 269 et le "417" Fourneau dans le traitement de la trypanosomiase humaine. [Fourneau 269 and "417" in the Treatment of Human Trypanosomiasis.]—*Bull. Soc. Path. Exot.* 1928. Oct 10. Vol. 21. No. 8. pp. 646-651

With the object of finding drugs which can be administered orally in the treatment of sleeping sickness, the author has tested two arsenical products provided by FOURNEAU viz. No. 269 or P-amino-o-oxypheyl-arsinic acid, and No. 417 or Formyl-p-amino-o-oxypheylarsinic acid. These drugs are intended to be used only by the mouth and are amongst the most active of the arsenicals prepared by FOURNEAU and his collaborators. They are as active when given by the mouth as when given subcutaneously in mice. The dose is not yet definitely determined. The author gave 1 gm. per day in 4 capsules, each containing 0.25 gm. This amount was well borne by the patients. The drugs were tested on cases in the first stage of the disease and also on chronic cases. Details are given.

Of the 5 patients treated with FOURNEAU 269 one an advanced case died after having received 4 gm. of the drug. Another disappeared 2 months after having received 4 gm. his blood having remained sterile up to that period. Of the 3 other cases still under observation, 1 in the first stage, has remained sterile 2 months after having received 13 gm. His cerebro-spinal fluid is normal and the weight has increased by 10 kilos. In the other 2 patients, who were at the commencement of the last stage of the disease the blood has been sterilized and the cerebro-spinal fluid has returned to normal. The first patient received 28 gm. and the second 42 gm. in courses of 4 gm. given in daily doses of 1 gm.

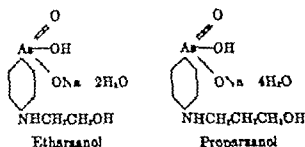
Of the 4 patients treated with FOURNEAU 417 one chronic advanced case was sterilized, but the cerebro-spinal fluid remained profoundly changed after 46 gm. of the drug. In another case at the commencement of the second stage of the disease, the blood was sterilized and the cerebro-spinal fluid returned to normal after 12 gm. Of the 2 remaining patients, who were in the first stage of the disease, 1 exhibited a relapse with parasites in the blood after a total dose of 20 gm. the second had a relapse after 4 gm. but remained sterile after 12 gm.

W Y

- 1 STRATMAN THOMAS (W.K.) & LOEVENHART (A.S.) The Biologic Study of Two New Pentavalent Trypanocidal Arsenical Compounds the Monosodium Salt of 2-p-Amino-Anilino-Ethanol (Etharsanol) and 3-p-Amino-Anilino-Propanol (Proparsanol)—*Jl. Pharm. & Experim. Therap.* 1928. Aug. Vol. 33. No. 4. pp. 443-457 (9 refs.) [Pharmacol. Lab., Univ. of Wisconsin, Madison.]

- II. STREATMAN THOMAS (W.K.) & LOEVENHART (A.S.) *The Therapeutic Value of Etharsanol and Proparsanol in Experimental Trypanosomiasis in Rats and Rabbits.*—*Ibid* pp 459-477 [6 refs.] [Pharmacol Lab Univ of Wisconsin Madison.]

i The authors record the biological work done with two new compounds with which they have had very promising results in the treatment of experimental trypanosomiasis. These compounds are etharsanol and proparsanol



In making solutions the monosodium salt was dissolved in distilled water a 10 per cent solution of etharsanol can be heated in the sterilizer at 15 pounds pressure for 30 minutes without materially increasing the toxicity. All doses given are for the hydrated drugs. The arsenic content of etharsanol is 20.32 per cent and that of proparsanol 20.68 per cent. The sodium salts as precipitated from water by alcohol, are white colourless, odorless, and practically tasteless substances.

The toxicity was studied using mice rats guineapigs and rabbits the drugs were administered intravenously intramuscularly subcutaneously intraperitoneally and orally. The *maximum tolerated dose* (M.T.D) is the maximum amount per kilo of body weight which is survived for 21 days by approximately 4 of 5 animals. The *minimum lethal dose* (M.L.D) is taken as the minimum amount per kilo of body weight required to kill approximately 50 per cent of the animals within 21 days. All doses are given in grams per kilo of body weight.

There is no perceptible difference between the clinical symptoms and pathological findings following the administration of etharsanol and proparsanol. The outstanding features in the course of severe intoxication with these drugs are those common to many aromatic arsenic acid compounds. The symptoms and course of the intoxication in the various animals are described in detail.

It was found that etharsanol produces no effects unless it is given in doses approaching the lethal. On this account and because of its rapid excretion, it can be given repeatedly in very large doses without producing deleterious effects. Thus while 0.35 gm. per kilo given intravenously is the M.T.D for the rabbit three doses of 0.25 gm (71.4 per cent. of the M.T.D.) may be given on alternate days without deleteriously affecting the animals. These characteristics also hold good for trypanamide. The toxicity of proparsanol was studied less intensively than that of etharsanol, because it soon became evident that it is less useful than the latter drug in the treatment of experimental trypanosomiasis and because it is more expensive to produce.

The maximum tolerated and minimum lethal doses are shown in the following table —

TABLE 14

Animal.	Administration.	Etharsanol.		Proparsanol.	
		M.T.D.	M.L.D.	M.T.D.	M.L.D.
		grams per kgm.	grams per kgm.	grams per kgm.	grams per kgm.
Mouse	Intraperitoneal	0.50	0.75	0.75	1.0
	Intravenous	1.25	1.40	1.40	1.75
Rat	Subcutaneous	0.80	1.00		
	Intramuscular	1.00	1.25		
	Intraperitoneal	0.80	1.00		
Guinea pig	Subcutaneous	0.15	0.25		
	Intramuscular	0.15	0.25		
Rabbit	Intravenous	0.35	0.50	0.20	0.40
	Intramuscular	0.50	0.60		
	Oral	0.30	0.70		

The following are the summary and conclusions —

"Two organic arsenical compounds have been studied to determine their toxicity for rats, mice, guinea pigs, and rabbits. The maximum tolerated and minimum lethal doses are shown in table 14.

Etharsanol produces no deleterious symptoms until doses approaching the lethal are reached, and three doses of 0.25 gram per kilogram (71.4 per cent. of the maximum tolerated dose) may be given on alternate days without injury.

"The low toxicity of these compounds compared with many other arsenical drugs, together with the fact that these drugs are well tolerated in repeated doses, warrant their study in experimental syphilis and trypanosomiasis.

"Proparsanol differs from etharsanol in having an extra methylene group in the side-chain para to the arsenic acid group. The extra methylene group produces no marked changes in the toxicity or type of action.

Etharsanol differs from trypanamide in having a primary alcohol group at the termination of the side-chain while trypanamide has an acid amide group. This change in structure yields a compound approximately twice as toxic as trypanamide."

ii. In the second paper the authors present their work on the therapeutic value of these drugs in experimental trypanosomiasis in rats and rabbits. Rats were inoculated intraperitoneally and rabbits intravenously with 1 cc. of a suspension of trypanosomes having one organism in a microscopic field. The rats were, as a rule, treated 24 hours after inoculation. In the rat *T. brucei*, *T. equiperdum*, *T. equinum*, *T. lewis* and *T. rhodesiense* were used and in the rabbit *T. brucei*, *T. equiperdum* and *T. rhodesiense* and treatment was instituted at different stages of the disease. Animals treated with etharsanol and proparsanol were kept under observation from three months to two and a half years. The length of life of untreated animals infected with the various strains is given in a table.

The *minimal curative dose* (M.C.D.) is taken as that dose which will cure 4 of 5 animals and the *therapeutic index* is obtained by dividing the M.T.D. by the M.C.D.

The results obtained show that etharsanol is an exceedingly effective drug in the treatment of experimental trypanosomiasis in rats and rabbits. In rats the therapeutic index is very high in rabbits it is also high but not nearly so high as in rats. Rabbits were cured late in the disease after involvement of the central nervous system as evidenced by extreme prostration lethargy and paralysis. It was found that the brain substance following the injection of etharsanol contained large amounts of arsenic. The authors state that they are sure that etharsanol penetrates the tissues of the central nervous system and that it kills the trypanosomes located there. Etharsanol is equally as effective as tryparsamide in clearing the cerebro-spinal fluid of trypanosomes.

In *T. brucei* infection of rats the curative dose of etharsanol by intramuscular injection is only twice that required by intravenous administration and the therapeutic index is 10. No disagreeable results were noticed on intramuscular injection and there was no tenderness or ulceration at the site of injection. The authors point out the great advantage of a drug which can be used intramuscularly.

As is shown in the table proparsanol is distinctly inferior to etharsanol and consequently the authors limit their further discussion to etharsanol and compare its effectiveness with that of tryparsamide. These drugs are quite similar compounds from many points of view etharsanol is somewhat more toxic but both are very rapidly excreted (in man 75 per cent etharsanol was excreted in 5 hours and 91 per cent in 4½ days) and neither produces toxic symptoms or organic changes in the tissues until they are used in doses approaching the lethal. Because of their rapid excretion they can be given at relatively short intervals. The trypanocidal power of etharsanol is the greater and its therapeutic index is higher than that of tryparsamide. In the few human cases treated with etharsanol, amblyopia was not seen but on this point more extensive trial is obviously required. Both drugs cause destruction of trypanosomes in the central nervous system and there appears to be no difference in the ability of the two drugs to cure rabbits late in the infection.

There is a striking difference between the two drugs. In paresis tryparsamide causes a very remarkable clearing of the mental symptoms in approximately 50 per cent of cases. LORENZ and BLECKWENN investigated the value of etharsanol in paresis and found that the drug does not cause these cases to clear mentally. In the author's view this important property of tryparsamide is not related to its treponemidal power it would seem reasonable to assume that tryparsamide has the power to cause resorption of perivascular granulomatous tissue in paresis and thus restore the impaired circulation to parts of the cerebrum, so that they may again function whereas etharsanol does not seem to have this property. It is doubtful, therefore whether etharsanol will relieve the clinical manifestations of central nervous system involvement in human trypanosomiasis notwithstanding its power to kill trypanosomes in the central nervous system. Extensive clinical trial alone can settle the point and, judging from the results obtained in experimental trypanosomiasis it would seem that its excellent trypanocidal power entitles etharsanol to extensive and carefully controlled clinical trials.

NATTAN LARRIER (L.) & LÉPINE (P) Essais de traitement des trypanosomiasis expérimentales par l'atoxyl associé à l'anatoxine tétanique. [Treatment of Experimental Trypanosomiasis by Atoxyl and Tetanic Anatoxin.]—*C. R. Soc Biol* 1928 July 27 Vol. 89 No. 25 pp. 557-559 [1 ref.]

In view of the fact that atoxyl aids the immunization of animals to tetanus anatoxin, the authors decided to enquire whether the anatoxin can reinforce the therapeutic action of atoxyl in trypanosomiasis.

Seven series of experiments each comprising 7 or 8 rats were performed. In each experiment the rats were inoculated with the same quantity of blood of a rat infected with *T. brucei*. One or two rats served as controls and the remaining six were divided into two groups: the first, on trypanosomes appearing in the blood, were given a dose of atoxyl corresponding to 1 cgm. per 100 gm. of body weight, and the second the same dose of atoxyl together with 1 cc. of tetanus anatoxin. On an average, the control rats died in 5 days, those treated with atoxyl alone in 10 days, and those treated with both atoxyl and tetanus anatoxin in 12½ days. It was also found that rats treated with the anatoxin alone died in the same time as the controls. Apparently the site of infection exercised some influence: when the atoxyl and anatoxin were injected at different parts of the body the duration of life was only 10½ days, whereas when they were introduced at the same point it was 12½ days. Further experiments showed that when the atoxyl and anatoxin were mixed and incubated at 37°C for 24 hours, the therapeutic action was increased since the duration of life was prolonged to 14½ days.

The conclusion reached is that tetanus anatoxin, although it has no therapeutic action, nevertheless is able to reinforce that of atoxyl.

W. Y.

BACCHELLI (Giulio) Lo "stovarsol sodico" nella cura della trypanosomiasi umana ed animale. Ricerche sperimentali su animali da laboratorio. ["Stovarsol sodium" in the Treatment of Trypanosomiasis, Human and Animal. Experiments with Laboratory Animals.]—*Arch. Ital. Sci. Med. Colon* 1927 Nov Vol. 8, No. 11 pp. 621-631. With 4 plates (1 coloured) [2 refs.] [Inst. of Trop. Path., Univ. Bologna.]

Experiments were carried out to test the dosage of this compound as regards its trypanocidal and toxic effects: the results on the trypanosomes themselves, and the curative properties of the drug. Infections with *T. cruzi*, *T. brucei*, *T. evansi* and *T. maroccanum* were tested, the dose ranging to 1 cgm. per kilo. and even higher. The conclusions arrived at were that it did not cut short the infection though it caused a temporary disappearance of the trypanosomes from the peripheral circulation: the trypanosomes become granular and vacuolated, but those not destroyed acquire increased resistance to the stovarsol: the body also acquired a tolerance to the drug and in so far as some of the parasites were destroyed the life of the host was prolonged: provided the dose was not a toxic one: when the drug was stopped the trypanosomes soon reappeared and the animal died.

H. Harold Scott.

SCHNITZER (R.) & SILBERSTEIN (W) Zum Mechanismus des chemotherapeutischen Heilungsvorganges Ueber die experimentelle Trennung der Kombination Chemische Wirkung+Ictus immunisatorius [The Mechanism of Chemotherapeutic Curative Processes. The Experimental Separation of the Combination Chemical Action+Icterus Immunisatorius.]—*Ztschr f Immunitätsf u Experim Therap* 1928. Sept 24 Vol. 58 No 1/2 pp 159-172. [12 refs] [Robert Koch Inst Berlin]

The following summary is given —

1 If mice which are doubly infected with a normal and a drug fast strain of trypanosomes are treated with a drug against which the drug fast forms are as resistant as possible it is found that the drug resistant forms disappear with the normal forms from the blood. This takes place however only when the normal and the drug fast strains are immunologically identical.

2 If in such mice a relapse occurs only individuals of the drug resistant strain are found. The parasites affected by antibodies and only these are to be regarded as the starting point of relapses

W 1

TORRES (G Magarinos) Endocardite parietale dans la maladie de Chagas (trypanosomiase américaine) [Parietal Endocarditis in Chagas' Disease]—*C R Soc Biol* 1928. Sept 18 Vol. 99 No 28 pp 888-888 [Oswaldo Cruz Inst Rio de Janeiro Brazil.]

In the necrosis of the cardiac musculature resulting from arteriosclerosis of the coronary arteries and in tuberculous and syphilitic myocarditis there is often an extension of the lesions from the myocardium to the epicardium and especially to the parietal endocardium. This raises the question whether the chronic form of myocarditis seen in American trypanosomiasis is not also accompanied by such lesions.

Details are given of the pathological lesions found at the autopsy of two persons aged 25 and 35 respectively who died in Brazil, in a region where trypanosomiasis is endemic from a cardiac form of the disease. One of the patients presented a chronic fibrous parietal endocarditis of the right auricle and of the left ventricle and a recent endocarditis with the formation of thrombus in the left auricle and summit of the left ventricle. In the other case a parietal endocarditis was observed in the summit of the left ventricle with subsequent thrombosis. In both cases the primary and essential lesion was a marked, diffuse chronic myocarditis presenting the histological characters usually observed in Chagas disease. The post-mortem protocols are given in detail.

| W 1

GEOGHEGAN (A J) Deux nouveaux cas de trypanosomiase américaine humaine dans la province de Catamarca. [Two Fresh Cases of American Trypanosomiasis in the Province of Catamarca.]—*C R Soc Biol* 1928 Nov 9 Vol. 99 No 31 pp 1417-1418.

Hitherto the author had been able to diagnose in the province of Catamarca, a single case of Chagas disease by blood examination

The discovery that 70 per cent of the *Trypanosoma infectans* were infected with the flagellates encouraged the examination of further human beings. The blood of 400 persons was consequently examined and two infections were found. The author considers that the disease is not so rare as is commonly believed.

W Y

DUKE (H. Lyndhurst) Immunological Studies of *Trypanosoma gambiense* and *T. rhodesense*—*Parasitology* 1928. Dec. Vol. 20 No. 4 pp 427-447 [3 refs.] [Human Trypanosomiasis Research Inst Entebbe, Uganda Protectorate.]

The author refers to his work on the transmissibility of the human trypanosomes by *Glossina palpalis*. As a result of these observations, which are recorded in the Final Report of the League of Nations Commission [this *Bulletin* Vol. 25 p 750] Duke concluded that a number of the human strains which passed through his hands at the Entebbe Laboratory were either in man himself or on first isolation in laboratory animals non-transmissible by the cyclical method by tsetse. After reviewing the available evidence it was further provisionally concluded, that it is of supreme importance to *Trypanosoma gambiense* (and probably also to other species of trypanosomes) that the vertebrate host be frequently exposed to tsetse during the early stages of its infection before the transmissibility of the strain is impaired. In nature this requisite will be fulfilled when susceptible hosts are numerous and the contact between them and the fly is close. Under such circumstances the trypanosome will be found widely distributed, a high percentage of the principal vertebrate hosts will be infected and the transmissibility of the strains will be high. It was also pointed out that this frequent passage of the parasite from host to host might aid the propagation of the trypanosome in another way by affording frequent opportunity for re-infection or super infection of the same host by fresh strains.

The main objects of the experiments in the present paper were —

1 To determine whether infection of a mammal with *T. gambiense* confers any immunity against subsequent infection by (a) the same strain, (b) a different strain of this trypanosome or (c) by *T. rhodesense* or *T. brucei*.

2 If infection results in the above circumstances and no solid immunity is demonstrated, we then have to inquire whether there is any finer or less obvious reaction produced by a long-standing infection such, for example, as might be manifested by changes in the transmissibility by tsetse of succeeding infecting strains of trypanosomes, when these are introduced into the blood stream of the animal under investigation.

To investigate this, an infected animal was selected in which the strain of trypanosomes had, in the course of time, lost its transmissibility. Flies, infective with a readily transmissible strain of *T. gambiense* from the same or a different patient, were then fed upon the animal. After a sufficient incubation period had elapsed for the new strain to appear in the peripheral circulation, clean flies were applied and the transmissibility of the now bivalent infection examined. In some instances the investigation was extended to include a third exposure to infection, after a suitable interval.

Concurrently similar experiments were performed in which animals carrying a strain of *T. gambiense* that had become non transmissible by tsetse were superinfected by flies carrying either *T. rhodesense* or the Damba trypanosome (*T. brucei* type).

In these experiments the technique employed was that described in the Final Report of the International Commission. Before proceeding to consider the actual experiments Duke sounds a note of warning. He points out that all the experiments have one defect in common viz the number of flies employed is of necessity small and mathematically there is a wide margin of error in drawing inferences from the data. Efforts have been and are now being made by concentrating attention on one or two strains to remedy this shortcoming.

After recording the observations in detail the following provisional conclusions are reached —

I Natural immunity against *T gambiense* as exhibited by sheep and goats varies from complete immunity to a degree of susceptibility in which the trypanosome may be a contributory or even possibly the direct cause of death. This last contingency is, however beyond doubt exceedingly rare. Between these extremes we find a peculiar partial immunity which operates solely on the transmissibility of the trypanosome by tsetse abolishing this property but leaving the strain still capable of producing gut infections in tsetse and still demonstrable in the peripheral blood.

It is as yet impossible to state whether this loss of transmissibility is attended by any coincident increase in the general resistance of the mammal against the trypanosome infection.

II Immunity can be acquired by sheep and goats against *T gambiense*. The earliest manifestation of the development of acquired immunity is the disappearance of the transmissibility of the strain by tsetse.

The development of immunity may be arrested at this stage for a considerable time the strain meanwhile retaining the power to develop in the gut of the fly or it may continue until the animal is both sterilised of an existing infection and immunised against subsequent infection with the same species of trypanosome. Once established absolute immunity may persist for at least six months.

When once the first stage of immunisation is reached by an animal, all strains of the same species of trypanosome subsequently introduced into its blood will produce non transmissible infections. In other words the animal, though still infected, has been rendered non infective for at all events a considerable time.

III Certain individual animals that are susceptible to infection attain, instead of the partial immunity that we have just described a condition of equilibrium with the trypanosome. The parasite then causes no inconvenience to its host and retains its transmissibility by tsetse for a considerable time (at least 15 months).

This state of affairs resembles that described in certain species of antelope infected with *T gambiense*. We do not yet know whether such a strain preserves its power of infecting man throughout its long sojourn in ruminant blood.

IV In the case of one of the two monkeys studied a different type of partial immunity was observed. The transmissibility of the original infecting strain disappeared. Subsequent infection with a transmissible homologous strain temporarily restored the transmissibility in diminished intensity. A third and this time heterologous transmissible strain then caused a striking increase in the transmissibility. The monkey remained all this time apparently in good condition.

Here is a phenomenon without exact parallel in sheep and goats. This animal had apparently developed a gradually increasing resistance to the trypanosome but the poise between host and parasite was much less perfect than that attained in Sheep 161.

Monkeys are much more susceptible to the pathogenic action of *T gambiense* than are ruminants. So also is man. It is very seldom that a monkey succeeds against *T gambiense* as No. 95 has done but in the case of man many instances are known of prolonged survival after infection by this trypanosome.

What we have noted in the case of Monkey 95 may thus easily occur in man in regions where *T. gambiense* exists in nature. It is possible, particularly in certain regions of Western Africa where human trypanosomiasis is found as a very chronic affection endemic for many years that there exists in man a condition of equilibrium between parasite and host similar to that obtaining in certain ruminant animals."

W. J.

CORSON (J. F.) A Note on Some Inoculations of Animals from Cases of Sleeping Sickness (*Trypanosoma rhodesiense*) in the Ikoma District of Tanganyika Territory—*Jl Trop Med & Hyg* 1928. Sept 1 Vol. 31 No 17 pp. 214-216. [4 refs.]

The only form of sleeping sickness known in the Ikoma area is that caused by *T. rhodesiense* which is almost certainly transmitted there by *Glossina swynnertoni*. Oxen, sheep and goats are kept in fairly large numbers in the villages where tsetse flies are relatively scarce. There are also some dogs. Where tsetse are numerous, domestic animals cannot survive and it has been proved that infection with polymorphic trypanosomes rapidly occurs if these animals are exposed to wild tsetse flies in certain parts of the district. In May 1926 the author inoculated six local sheep of the sleeping sickness area with the blood of five untreated cases of sleeping sickness—all became infected and died about two months later except one which lived for five months. Subinoculation into white rats was successful in each case: these rats usually lived for about forty days which was about the average duration of life of white rats directly infected from man. The sheep were adults and in good condition before inoculation, and were kept for a time in a nearly fly-free area, and shortly afterwards conveyed to a fly-free place outside the sleeping sickness area. As the blood was negative for some time after infection the question of natural infection with *T. brucei* may be almost excluded. The fact that there were no failures warrants the view that most of the local sheep are susceptible to direct infection from most of the human cases of sleeping sickness. In the same month a young dog was infected from a patient and the infection subsequently transmitted directly to two other dogs successively and to white rats.

In July 1927 three sheep and three goats of a fly-free area were inoculated with three strains of *T. rhodesiense* conveyed in white rats infected from sleeping sickness patients of the Ikoma district. Two strains infected the animals, a sheep and a goat in each case while the third strain failed to infect either a sheep or a goat. The infected animals except one which was apparently killed by a hyaena died within two months.

Reference is made to the recent work of KLEINE who inoculated twelve strains of *T. rhodesiense* from untreated patients into guinea-pigs, and showed the differences in morphology of the trypanosomes of different strains, and the variations in the percentages of posterior nuclear forms from time to time in the course of the infection. The author made similar observations on six other strains in the same area. He did not see any posterior-nuclear forms in the long and slender trypanosomes and remarks that the nucleus was not regarded as posterior unless it was within a distance of its own diameter from the blepharoplast. In none of the trypanosomes was the nucleus on a level with the blepharoplast or posterior to it. It seemed advisable to inoculate more than one animal from the same patient at the same

time using equal amounts of blood so that two guineapigs were inoculated from each case and in the first three strains two white rats also. The details are shown in a table. The results of the inoculation of one of the strains showed that virulence for the animals is not necessarily associated with polymorphism and the presence of numerous posterior nuclear forms. In all the four animals infected with this strain the trypanosomes multiplied very rapidly and remained almost without exception long and slender and killed the animals quickly. The number of posterior-nuclear forms appears to depend on the kind of animal used the percentage in guineapigs being greater than in white rats.

Inoculations of white rats from relapsed cases previously treated with Bayer 205 with or without other drugs gave results from which only indefinite conclusions can be drawn as is shown in a table. In such cases the trypanosomes in the blood vary much more in number from day to day than in untreated cases. In a single case where they were observed in a thick film on the day of inoculation the injection of 2 cc. of blood failed to infect the rat. It may be suggested that relapsed cases after previous treatment with Bayer 205 are less of a public danger than untreated cases even though the former being usually less continuously ill can get about more and so are more exposed to tsetse flies when these are not in the villages.

W Y

STERN (L.) & ROSENGOLZ (H. P.) L'effet de la trypanosomiase expérimentale sur la barrière hémato-encéphalique [The Effect of Experimental Trypanosomiasis on the Haemo-Encephalic Barrier]—C R Soc Biol 1928 Oct 19 Vol. 99 No 28 pp 1108-1110 [Med. Biol Inst & Experim Vet Inst Moscow]

The authors investigated the changes in the resistance of the haemato-encephalic barrier to the passage of certain colloids and crystalloids in animals experimentally infected with trypanosomes. The observations were made on dogs and rabbits infected with *T. equiperdum*. The animals were examined during the incubation period the first febrile period the apyrexial period and the subsequent relapses. The procedure consisted in sub-occipital puncture and examining the cerebrospinal fluid for the substances previously injected into the blood viz. NaI, Na₂Fe(CN)₆, trypanblue and antibody.

In dogs the resistance showed no change in the incubation period during the first paroxysm NaI and Na₂Fe(CN)₆ appeared in the cerebrospinal fluid, and the diminution in resistance to these crystalloids persisted during the apyrexia and subsequent pyrexias (35-40 days). The permeability for Na₂Fe(CN)₆ was more marked than for NaI. Trypanblue was found quite definitely in 10 per cent of cases doubtfully in 20 per cent. and was entirely absent in 70 per cent. The natural antibody was never found.

In only two rabbits were parasites found in the blood but infection was demonstrated in the other animals by inoculation of spleen pulp or blood into mice. During the acute stage the resistance of the barrier was lowered to NaI and Na₂Fe(CN)₆. In animals with cachexia, keratitis paresis oedema, etc. the resistance was lessened both to the crystalloids and to trypanblue. In most of the animals the injection of trypanblue was quickly followed by death.

W Y

VATTAY LARRIERE (L.) RAMON (G.) & LÉPINE (P.) Anticorps naturels et perméabilité placentaire. [Natural Antibodies and Placental Permeability].—*C. R. Soc. Biol.* 1928. May 18. Vol. 88. No. 15 pp. 1279-1281

The human placenta does not permit of the passage either of the natural anti-sheep haemolysin or of the substance which exercises a protective action against trypanosomes. This raises the question whether these natural antibodies do not possess a different protein support from that of the artificial antibodies e.g. diphtheria and tetanus antitoxins or artificial haemolysins which can pass from the mother to the foetus. Previous studies on the fractional precipitation of antitoxic sera have established that the pseudo-globulin contains almost the whole of the diphtheria and tetanus toxins whilst the euglobulin contains only a very small quantity and the sero-albumin contains none. These facts led the author to investigate what fractions of human serum possess the anti-trypanosomal power and which contain the anti-sheep haemolysin.

As a result of their work it was found that the pseudo-globulin is the principal, if not sole support, of the anti-trypanosomal substance of human serum, whilst the protein support of the anti-sheep haemolysin of human blood is euglobulin. But although they have different protein supports the anti-trypanosomal substances and the anti-sheep haemolysin are both equally incapable of passing the placenta. Since the placenta is permeable to artificial antibodies e.g. diphtheria and tetanus antitoxins, and is not permeable to the anti-trypanosomal substance it appears that the impermeability of the placenta to natural antibodies is not due to their protein support.

W Y

LEUFOLD (Frida) Untersuchungen über Rezidivstämme bei Trypanosomen mit Hilfe des Rieckenberg Phänomens. [Investigations with the Rieckenberg Phenomenon on Relapse Strains of Trypanosomes].—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Sept. 10. Vol. 108. No. 1 pp. 144-156. With 2 text figs. [7 refs.] ["George-Speyer" House Frankfurt a.M.]

RIECKENBERG described in 1917 a phenomenon which occurred when the blood of a mouse or rat cured after a trypanosome infection was mixed with blood containing homologous trypanosomes. This phenomenon is known as the Rieckenberg reaction [thrombocytobarricade or adhesion phenomenon]. On the admixture of the blood from the cured animal, a drop of blood containing the same trypanosomes, and a drop of citrated bouillon, the blood platelets became fixed to the flagellar end of the trypanosomes. Small masses of platelets thus became adherent to the trypanosomes or lay upon them, and finally completely enveloped the actively motile parasites. RIECKENBERG found that this phenomenon only occurred with homologous strains. Furthermore, it was ascertained that the phenomenon occurred not only with mice, but with guinea-pigs and rats and RIECKENBERG showed that relapse strains of trypanosomes behaved as heterologous strains. RIECKENBERG did not regard the phenomenon as an antibody reaction, but evidence in support of this was later produced by KATCHEWSKY and his colleagues. Since the reaction is very easy and can be made in a few minutes, it is suitable for study of

immunity processes and especially of relapse strains in trypanosomes and recurrent fever because it permits in a short time of a decision on the immuno-biological properties of the parasites. The author decided to investigate this subject. A number of mice at the height of the infection with *Trypanosoma brucei* strain Prowazek, were cured with neosalvarsan and after several days killed and bled. From this immune blood the serum was obtained. If this serum was directly employed for the Rieckenberg reaction by mixing with trypanosome-containing blood of homologous strains, marked agglomeration of the trypanosomes very easily occurred so that the characteristic adhesion phenomenon of blood platelets was masked. For this reason, the serum in doses of 0.25 to 0.5 cc was injected intraperitoneally into normal mice. After 24 hours the mice contained in their blood a sufficient amount of substance to produce the Rieckenberg phenomenon without the occurrence of the agglomeration trypanosomes.

The author summarizes the results of his work as follows —

1 The blood platelet test of Rieckenberg has furnished useful results in the differentiation of relapse strains of trypanosomes. There is agreement between the re-infections method and the blood platelet reaction.

2 The Rieckenberg method which was re-examined in the case of recurrent fever spirochaetes by Kritchewsky and Brassin and found by them to be useful, is thus to be recommended as a simple procedure for the identification and differentiation of trypanosome strains. The conclusion reached by Kritchewsky and others as a result of their experiments that the blood platelet test is dependent on the presence of specific antibodies which act on the homologous trypanosomes is confirmed. The blood platelets take a secondary part in the procedure.

3 Serum containing antibody can be conserved in the ice box, and for the demonstration of the reaction be injected into normal mice. The blood of these passively immunized mice gives the reaction for days or even weeks without the appearance of the disturbing agglomeration phenomenon of the trypanosomes.

4 In completion of the observation of Ritz that the number of possible relapse trypanosome strains in the course of a chronic infection of mice produced artificially through sub-therapeutic doses may be unlimited, it was found that the following relapse strains were obtained in the first paroxysm: in over 50 first relapses occurring in different mice and on different days, 56 per cent. corresponded to Type I₁₄₄, 20 per cent. to Type I₁₀₈, whilst in 20 per cent. the so-called binary type appeared which reacted with both immune receptors. In only 4 per cent. did other kinds of receptors appear which seemed to have no relationship to the antibodies obtained from the many relapse strains. The variation capacity of trypanosomes of the first relapse is thus limited.

W 1

DUBOIS (A.) Mort par hypoglycémie dans les trypanosomiases aiguës. [Death from Hypoglycaemia in Acute Trypanosomiasis].—*C R Soc Biol* 1928, July 27 Vol. 99 No 25 pp 656-657 [2 refs.] [Bact Inst Louvain]

Experiments are recorded which suggest that in certain acute trypanosomiases of guineapigs and mice death is due to hypoglycaemia. The observations were made on two guineapigs and six mice at a time when the blood swarmed with parasites and when the clinical signs indicated that dissolution was imminent. In seven of the eight animals

in this condition subcutaneous injection of glucose (10 cgm. for a mouse and 1 gm. for a small guinea-pig) produced a veritable resurrection. Within 5 to 10 minutes the animals got up and commenced to move about and, in the most striking cases, appeared normal and began to feed. In one instance laevulose replaced glucose with the same results. Lactose was inactive. The duration of life following the injections was usually short but sometimes as long as 24 to 36 hours. The author states that he does not believe that repeating the injection would have prolonged life to any great extent.

W. Y.

LEDENTU (G.) Au sujet des trypanotoxines [Trypanotoxins].—
Bull. Soc. Path. Exot. 1928, July 11, Vol. 21, No. 7, pp.
 544-551. [12 refs.]

The clinical phenomena observed in trypanosomal infections appear so clearly due to an intoxication that the early workers spent much time in attempting to demonstrate the existence of soluble products. A brief review of the literature of the subject shows, however, that these researches have not been rewarded with any great measure of success. BRICK, LAVERAN and PETTIT and others, performed experiments which they considered demonstrated the existence of a trypanotoxin but these results do not carry conviction and might well be due to anaphylaxis as has been suggested by MARCORA, MUTEF and many other workers.

Ledentu points out that in all the earlier work the extracts of trypanosomes were injected intraperitoneally or intravenously and that such routes are much more likely to result in the production of anaphylactoid phenomena than the subcutaneous route. In all his experiments subcutaneous injections only were given but he admits at once that his experiments were not more fortunate than those of his predecessors. In his work he used *T. brucei*, *T. equiperdum* and *T. gambiense* obtained from rats at the height of infection. With each of these strains he performed three groups of experiments.

In the first the trypanosomes isolated by centrifuging citrated blood were washed in saline, dried for some hours at 37° C., ground up, and then taken up with saline. Of the 32 mice injected subcutaneously with doses varying between 0.05 gm. and 0.1 gm., 20 survived and 12 died. Those which survived were not immune not even after several doses of the extract. The deaths occurred between 24 hours and 6 days, average 4 days after the injections. In 4 of the 12 fatal cases, the extract was very pure and contained but few red cells, whereas in the other 8 cases red cells were present in fair numbers, so that the extract was of a red-brown colour. Contrary to the view of LAVERAN and PETTIT the author has enquired whether the presence of the damaged red cells did not influence the result. From the post-mortem appearances and from experiments with red cell extracts alone Ledentu reached the conclusion that they did.

In a second group of experiments an attempt was made to get rid of the formed elements of the blood by means of a rabbit anti-rat serum. This serum could be injected into the infected rats in a dose of 1 cc., or it could be mixed *in vitro* with the infected blood with or without the addition of guinea-pig complement. The trypanosome extract was then

obtained as before. These experiments did not give any positive result. 12 mice injected with 0.05 gm presented only evidence of slight indisposition.

In the third group of experiments which were based on the general view that toxins belong to the albumin group and antitoxins to the globulin group the author attempted to ascertain whether evidence of the presence of these bodies could be demonstrated in the serum of infected animals or in autolysed trypanosomes. The proteins were isolated as follows: the globulins by half saturation with ammonium sulphate, filtration and washing; and the albumins in the filtrate by complete saturation with ammonium sulphate. The products obtained were re-dissolved in water and purified by dialysis in small celloidion sacs. Among the 30 mice and 2 guinea-pigs injected with 0.05 gm. to 0.1 gm. for a mouse and 0.25 gm. for a guinea-pig 8 deaths occurred, but these did not appear to be due to a trypanotoxin but either to repetition of the injections or to lack of purity of the material which contained traces of the very toxic sulphate of ammonium. Attempts to separate the proteins in the trypanosome bodies did not give more satisfactory results.

On summarizing his work and that of others the author concludes that laboratory experiments do not permit of any conclusion on this subject. He has not been able to obtain any clear and definite evidence of toxins. It is necessary, however, to remark that the physiology of the trypanosomes utilized in all laboratory experiments is profoundly modified by the artificial biological conditions to which they are submitted. The clinical signs occurring in the course of the infection clearly support the view of an intoxication viz the asthenia, headaches, fever, transient erythema, palsies, delirium, somnolence and coma are classical signs of all septicaemias. The toxin secreted by trypanosomes may indeed be but slightly active as is the case with many of the bacteria but the fact that in acute dourine the animal succumbs with paralytic signs although the trypanosomes are very scanty in the blood and are localized in the oedematous plaques suggest a true toxæmia. On the contrary *T. larsii* may swarm in the blood and cause no symptoms.

In conclusion, the author believes on clinical grounds that the existence of trypanotoxins is very probable but for the time being they are not demonstrable experimentally.

W X

GUTIÉRREZ LARA (J) Notas previas sobre la formol-gelificación en la tripanosomiasis humana. [Note on the Formol-Gel Test in Human Trypanosomiasis].—*Med. Países Cálidos* Madrid 1928. July Vol. 1 No 4 pp 377-378 [3 refs]

The author carried out this test on cases of trypanosomiasis at various stages and reports that he found it positive in 80 per cent. of patients and that it is a valuable diagnostic aid in the early stages even when only one or two small glands are present. He finds that in the second stage of the disease within an hour of injection of Bayer 205 the result is positive when no trypanosomes can be found in the blood.

H Harold Scott

the phenomenon seemed so interesting that he decided to re-investigate it with the abundant material at his command. In all, he performed 95 experiments using the technique of his predecessors. These experiments are summarized in 8 tables.

The experiments confirm the finding of ROSENTHAL that the trypanocidal substance of human serum has nothing to do with the normal antibodies. This statement is based on the result of observations made with blood from the umbilical cord and retroplacental blood, both of which protected mice against nagana. It was further shown that the trypanocidal substance was present in a whole series of infants at the third week of life—this is in contradiction to the findings of NEUMANN and POGORSCHIELSKY (1925). Atrophic conditions and infections could not be demonstrated unequivocally to exert any influence on the trypanocidal substance. Even serum taken shortly after death exhibited a definite protective action in cases in which it had been shown to be protective in life.

W 1

RABIES A REVIEW OF RECENT ARTICLES \.*

Before proceeding to the review of articles referring to rabies in particular I would draw the attention of all rabies workers to an article on filtrable viruses in general. In this stimulating and suggestive address BOYCOTT¹ examines the foundations of our beliefs regarding the nature of filtrable viruses and in particular discusses the transition of live to dead. After a masterly exposition of the analogies which exist between the live and the dead as regards their integral nature the possibility of transformation of one type into another capacity for self repair variability mass action phenomena and cyclic changes he concludes that the antithesis is a false one—that there are things which are not so live as a sunflower and not so dead as a brick and that filtrable viruses and similar agents represent part of this intermediate group. He then marshalls some interesting facts regarding the size of filtrable viruses their composition metabolism stability and resistance to harmful agents and their incapacity for independent life. Finally in discussing the question of multiplication he examines the views held as to their origin whether *de novo* or from external infection basing his deductions largely on the Rous virus and concludes —

We seem to have a fairly definite group of things which (a) are very small (b) can multiply (c) have no independent life (d) are of uncertain origin. Of their multiplication we know that the association of live cells is necessary and that it occurs when the specific agent is manifested we do not know that direct multiplication is possible at all. Of their origin we have strong grounds for thinking that some are derived from live cells and we cannot exclude this ancestry for any of them. They seem, too to form a series (1) the growth promoting substances from tissues show indirect multiplication but make no other suggestion of life (2) lysozyme would pass for an enzyme except that it can multiply (in the presence of *M. lysodeikticus*) (3) the Rous agent and the bacteriophage arise repeatedly in malignant tumours and bacteria respectively and may be in some sense alive but they are not independent species of animals or plants (4) the pathogenic viruses represent a further step towards being wholly alive. Taking one thing with another I am inclined to think that they are both the cause and the result of their diseases as SANFELICE suggested for epithelioma contagiosum. Somehow or other a virus arises in an animal or plant and by its action on the tissues causes them to produce more of itself. Some viruses (e.g., smallpox) acquire a considerable capacity of spreading from infected to normal individuals and the majority of cases of the disease are so caused the virus is on the way towards independence. Others (e.g. herpes) have little or no power of dispersion and most cases are due to the virus arising *de novo* under the appropriate stimulus (whatever that may be).

Detached quotations are never satisfactory and are often misleading. The article should be read as a whole. It is a quarry of erudition and of suggestive ideas.

Clearly then the virus of rabies is one of the most live of the filtrable viruses and in this sense its behaviour approximates to that of pathogenic bacteria. But the characteristics which are evidenced mainly by the more lowly members may also pertain in some degree to rabies virus and in studying rabies they should not be set aside.

* For the ninth of this series see Vol. 25 pp 706-715

[¹ BOYCOTT (A. E.) The Transition from Live to Dead the Nature of Filtrable Viruses.—*Proc Roy Soc Med* 1928 Nov Vol. 22 No. 1 pp 55-69 (Sect. of Path. pp 1-15) [2 refs.]

In studying the questions of the nature of the rabies virus of its behaviour with regard to the formation of inclusion bodies, of its possible cultivation due regard must be paid to the characteristics of filtrable viruses in general.

1. *Virus*. Another thoughtful paper is that by Brossov² on the characteristics of fixed virus. He found that when fixed rabbit virus was subpassaged through guineapigs the salivary glands were highly infective and that the virus contained in them approximated to the type of street virus. At the same time the virus contained in the brain behaved like the original fixed virus. The incubations after gland inoculation were long but on subpassage they returned to the normal period or in rare instances consumptive rabies developed. Thus in a large proportion of animals inoculated with salivary gland the virus was more highly concentrated in the glands than in the nervous system. That the long incubations observed after infection with glands was not due to a weakening of the virus is shown by the fact that after a year of gland passages the incubation when the brain is subpassaged remains unaltered although the duration of the sickness may be prolonged owing in the author's opinion to a lowered toxicity.

Thus apparently the fixed virus of the salivary gland must be classed as lying intermediately between ordinary fixed virus and street virus.

The characteristics of ordinary fixed virus are high toxicity and sharply defined incubation period. Those of street virus are high infectivity and absence of the organo-specific characters which are developed by passage from brain to brain. The lengthening of the duration of disease in inoculations with salivary gland are an expression of lowered toxicity indeed all the symptoms of rabies and the corresponding pathological changes are the result of toxic action. Thus in conclusion the term fixed virus is only relative and fixed virus, as it is found in salivary glands has quite other characteristics from fixed virus passed from brain to brain.

In a paper which follows the last, SCHWENKSTURM³ shows that in contrasting various strains of street virus by subdural inoculation, the incubation period is not related to the minimum lethal dose. Thus with incubation periods of 9, 9, 16, 30 and 18 days the corresponding lethal doses were one 2,000th, one 5,000th, one 8,000th, one 2,000th and one 700th of a milligramme respectively. He states that for the rabbit inoculated subdurally the minimum lethal dose of fixed virus is greater than that of street virus. In a series of experiments in which fixed virus was subpassaged through guineapigs the lethal dose to subdural inoculation fell from one 500th to one 80,000th, whilst infectivity by the subcutaneous and intramuscular routes which initially was absent, reappeared. In this series the incubation period with subdural inoculation remained unchanged. In another series in which street virus was employed, reduction of the minimum infecting dose was accompanied by a shortening of the incubation period.

It will be seen that these authors have studied viruses with regard to their (1) infectivity (i.e. minimum lethal dose when injected subdurally) (2) the incubation period which they induce (which is related

² BROSSOV (B). Charakteristik des Begriffes Virus fix.—*Mon. Arch. Hyg.* 1928 Aug 9 Vol 41 No 32. pp 1145-1149. [Federal Rabies Vaccine Inst. Vienna.]

³ SCHWENKSTURM (Fritz). Zur Frage der Virulenz des Virus fix.—*Mon. Arch. Hyg.* 1928 Aug 9 Vol 41 No 32. pp 1149-1151. [Federal Rabies Vaccine Inst. Vienna.]

to organ-specificity) (3) the duration of the resulting sickness (which measures their toxicity) The first characteristic is in bacterial diseases at least a function of lag in rate of multiplication operating against existing antibodies, as has been shown by Hedley WRIGHT in the case of the streptococci. The second is related to the rate of multiplication and depends upon the culture medium. The third is due to the deleterious action of each individual organism and may be called its specific toxicity. These three characteristics are fundamental and in comparing strains of either fixed or street virus their study is essential.

For estimating virulence MARIE and MUTERMILCH⁴ recommend intraspinal inoculations. This admits of the introduction of larger quantities of emulsion and is apparently more infective. Thus with even day cords which were inoffensive when administered intra-ocally infection occurred in nine out of ten rabbits treated intraspinally.

ANDO and NISHIBE⁵ claim that they have invariably observed Negri bodies (smaller in size than the usual but without internal formations) in rabbits infected with fixed virus.

MANOUELIAN and VIALA⁶ refer to RABIAUX experiments on the infectivity of saliva obtained from a fistula in Wharton's duct and ascribe the results to lesions in the canal which is lined by epithelial cells amongst and external to which lie nerve ganglia.

REMLINGER⁷ discusses the neuro-infections mortelles auto-stérilisables of LEVADITI SANCHIS BAYARRI and SCHOEN (*C R Soc Biol* 1928 xcviii p 911) and MARIE and MUTERMILCH (*ibid* p 1314). The condition is that the brains of animals which have been infected with fixed virus and have died as a result of its action may give negative results on subpassage. It has been ascribed to a defensive or auto-sterilizing action against the noxious agent which operates so intensely as to cause death. REMLINGER is sceptical. He argues that if the process of auto-sterilization occurs at all it ought to be more apparent in cases in which the duration of sickness is prolonged. Such cases are not rare and on subpassage the result is usually positive. With regard to the experiments of MARIE and MUTERMILCH he points out that the virus was introduced into the spinal canal and that this may favour defensive action. Until more experimental evidence is brought forward he remains sceptical.

Increased interest has been aroused regarding the transmission of the virus along nerve trunks. BOBES⁸ describes two cases of rabies

⁴ MARIE (A. C.) & MUTERMILCH (S.) Note sur la virulence des moelles rabiques. — *C R Soc Biol* 1928 June 15 Vol 99 No 20 pp 138-140 [1 ref.]

⁵ ANDO (Keizaburo) & NISHIBE (Masujiro) Ueber die Ursache und den diagnostischen Wert des morphologischen Unterschiedes der Negrischen Körperchen zwischen dem Strassenvirus und dem Virus-fixe — *Scientific Reports Govt Inst Infect Dis Tokyo* 1927 Vol 6 pp 205-222 [8 refs.]

⁶ MANOUELIAN (Y.) & VIALA (J.) Neurones virulents et canaux excréteurs des glandes salivaires. — *C R Acad Sci* 1928 July 9 Vol 187 No 2 pp 151-153 [1 ref.]

⁷ REMLINGER (P.) La rage peut-elle prendre place parmi les neuro-infections mortelles auto-stérilisables? — *C R Soc Biol* 1928 June 15 Vol. 99 No. 20 pp 118-120 [4 refs.] [Pasteur Inst. of Morocco Tangier]

⁸ BOBES (Sever) Septinevrite rabique chez l'homme avec mort subite cardiaque. — *C R. Soc Biol* 1928. Oct. 19. Vol. 99 No 28. pp 1108-1108 [8 refs.] [Anti-Rabies Inst., Bucharest.]

in which sudden death occurred before the onset of paralysis, and without showing evidence of any pre-existent cardiac lesion. The symptoms resembled those of angina pectoris. He suggests that the virus had become localized in the cardiac ganglia.

MANOUÉLIAN and VIALA⁹ have repeated the experiments of PASTEUR, CHAMBERLAND and ROUX (1884) which showed that the pneumogastric nerve may be infective in canine rabies. They have found many lesions containing parasites in the plexiform ganglia, in the neurones which are insinuated between the fibres of the nerve, and in the sympathetic. They ascribe the infectivity of the pneumogastric nerve to the presence of infected neurones amongst its fibres. REMLINGER and BAILLY¹⁰ from experiments on dogs with street virus inoculated subdurally find that in the case of a street virus with an incubation period of 16 days the virus is present at the point of inoculation, and in the nuclei of the facial nerves on the 9th day (i.e. five days before symptoms declared themselves in the control animals). The virus was more active at the point of inoculation than in the facial nuclei as was shown by the shorter period of incubation in test animals. NICOLAU and GALLOWAY (C. R. Soc. Biol. 1928, xcvi, p. 31) had found that emulsions of 26 brachial and sciatic nerve trunks taken from 19 rabbits which had died from a subdural inoculation of street virus conveyed rabies to 30 out of 30 rabbits, after subdural inoculation (i.e. 100 per cent. success). Somewhat less constant results were obtained by NICOLAU and SERRANESCU¹¹ in the case of fixed virus, suggesting that the virus of the street has a greater aptitude for transmission along nerves than has fixed virus. That transmission occurs only along the nerve trunks was confirmed by a further experiment, in which the distal portions of the nerves of one side (the continuity of which had previously been interrupted by operation) were non-infective (10 animals) whereas the corresponding portions of the nerves of the opposite side which had not been divided proved infective in 5 out of 6 rabbits. NICOLAU¹² in a further communication extends these results and finds, from experiments on 48 rabbits killed at various intervals after intracerebral inoculation that the brachial and sciatic nerve trunks became infective on the 5th day. The observation that positive results were more constant with street than with fixed virus suggests to the author a possible explanation of paralytic accidents. He argues that since immunity to rabies is a tissue immunity the fixed virus must reach the central nervous system before it becomes operative. In the rare cases where the dispersion of the fixed virus of the vaccine is retarded or prevented, whilst the street virus from the infecting dose is rapidly disseminated it is possible

⁹ MANOUÉLIAN (Y.) & VIALA (J.) Cefales nerveuses et virulence du pneumogastrique dans la rage canine.—C. R. Acad. Sci. 1928. Oct. 15. Vol. 167. No. 16. pp. 666-667. [2 refs.]

¹⁰ REMLINGER (P.) & BAILLY (J.) Contribution à l'étude de la propagation du virus de rue dans le système nerveux central.—C. R. Soc. Biol. 1928. June 8. Vol. 99. No. 19. pp. 14-15. [Pasteur Inst. of Morocco, Tangiers.]

¹¹ NICOLAU (S.) & SERRANESCU (Verg.) Septicémie expérimentale à virus rabique fix dans l'organisme du lapin.—C. R. Soc. Biol. 1928. June 29. Vol. 99. No. 22. pp. 294-297. With 2 text figs. [2 refs.] [Pasteur Inst., Paris.]

¹² NICOLAU (S.) La vitesse de dispersion du virus rabique des rues dans les nerfs périphériques des lapins infectés par voie sous-cutanée médiane.—C. R. Soc. Biol. 1928. Sept. 18. Vol. 99. No. 26. pp. 677-678. With 1 text fig. [3 refs.] [Pasteur Inst., Paris.]

that a paralytic syndrome might eventuate. (But paralytic accidents occur in the absence of street virus.)

WETHMAR¹³ finds that the effect of 1 per cent. carbolic acid on 5 per cent. fixed virus brain emulsion is most potent at a temperature of 20-22° C. After five days virulence is lost. In the ice chest no action was observable.

CUNNINGHAM NICHOLAS and LAHIRI have continued their experiments on the action of ether. They find from experiments on 81 rabbits¹⁴ that the virulence of street virus is retained in infected cords for 84 hours but not for 96 and as this degree of resistance is the same as that of street virus in brain tissue they conclude that the velocity of action does not depend upon penetrability but is specific. From experiments on 33 rabbits¹⁵ they found that the virulence of fixed virus (obtained from the Pasteur Institute of Paris) was retained for 144 but not for 168 hours. (These results are higher than those obtained by REMLINGER and ALIVISATOS.) The Paris strain of fixed virus is thus more resistant than the Kasauli strain. The virulence¹⁶ of a freshly fixed virus of Indian origin was retained for 84 hours but not for 96. This is a lower figure than that given by the French virus or by the ordinary Kasauli strain.

Experiments conducted by GILDEMEISTER and KARMANN¹⁷ on the existence of a cross immunity between rabies and vaccinia have yielded a frank negative. Nine rabbits which had been treated by corneal application of vaccinia virus and subsequently were infected corneally with rabies virus behaved in every respect similarly to nine untreated. Ten treated with Lyssin gave no immunity to corneal infection with rabies virus as compared with ten controls. Ten treated with Lyssin were not immunized against corneal infection with vaccinia virus as compared with ten controls.

ii. *Clinical* A case of rabies is described in the *Long Island Medical Journal*¹⁸ and Dr JOHN B TORRE discusses the possibility of curing the manifested disease. KOLDJEW¹⁹ has estimated the

¹³ WETHMAR (Rudolf). Die Einwirkung der Carbonsäure auf das Virus fixe — *Zischr. f. Hyg. u. Infektionskr.* 1928 July 3 Vol. 108 No. 4 pp. 802-805. With 1 chart in text. [7 refs.] [Robert Koch Inst. Berlin.]

¹⁴ CUNNINGHAM (J.) NICHOLAS (M. J.) & LAHIRI (B. N.). An Investigation into the Value of an Etherised Vaccine in the Prophylactic Treatment of Rabies. Part III. The Action of Ether on Street Virus in Infected Cords — *Indian J. Med. Res.* 1928 July Vol. 16 No. 1 pp. 245-251. [6 refs.]

¹⁵ CUNNINGHAM (J.) NICHOLAS (M. J.) & LAHIRI (B. N.). An Investigation into the Value of an Etherised Vaccine in the Prophylactic Treatment of Rabies. Part IV. The Action of Ether on the Virus Fixe of the Pasteur Institute Paris. — *Indian J. Med. Res.* 1928 July Vol. 16 No. 1 pp. 253-257. [7 refs.]

¹⁶ CUNNINGHAM (J.) NICHOLAS (M. J.) & LAHIRI (B. N.). An Investigation into the Value of an Etherised Vaccine in the Prophylactic Treatment of Rabies. Part V. The Action of Ether on a Freshly Fixed Virus of Indian Origin. — *Indian J. Med. Res.* 1928 July Vol. 16 No. 1 pp. 259-261. [8 refs.]

¹⁷ GILDEMEISTER (E.) & KARMANN (F.). Bestehen zwischen Variola und Lyssa Immunitätsbeziehungen? II. Mitteilung — *Corr. I. Abt. Orig.* 1928 Aug. 21 Vol. 109 No. 5-6 pp. — [Reichs Health Office Berlin-Dahlem.]

¹⁸ LONG ISLAND MEDICAL JOURNAL. 1928 Mar Vol. 22 No. 164. Case Report from the Staff Conference of the Kings Coll. — Rabies.

¹⁹ KOLDJEW (B.). Ueber Glykämie bei experimenteller ... — *Dent. Tiersch. Woch.* 1928 June 2 Vol. 36 No. 22. [8 refs.] [Bact. Inst. Kiev.]

blood sugar of 20 rabbits infected with fixed virus by the Hagedorn-Jensen test. During the incubation period he has observed no change. The slight increase which occurs with the commencement of symptoms is to be explained as secondary to a rise in temperature. In the last stages of the disease a more definite increase was observed in half of the rabbits examined. After death the blood sugar was increased in two-thirds of the cases as were also reducing substances in the urine. He considers that the hyperglycaemia is the result of injury to the floor of the 4th ventricle by the advancing process of infection.

iii. *Pathological.* LOVEBERG²⁰ describes the pathological changes observed in the nervous systems of four cases of human rabies. Inflammatory lesions were observed in the substantia nigra and grisea, and sometimes in the meninges. The lesions were similar to those found in encephalitis lethargica. The pigmented centres of the substantia nigra showed neuronophagia, with phagocytosis of pigment by the neuroglia. The shorter the incubation period the more definite was the inflammatory process. Degenerations on the other hand, were localized chiefly in the cortex and in the basal ganglia. In one case meningeal changes were prominent and in another a purulent inflammatory process was observed chiefly in the grey nuclei of the pons and the substantia nigra. The latter case was one of short incubation (18 days).

LEXCI and ESQUIVEL²¹ state that in canine rabies especially in its paralytic form, the spleen is hypertrophied, and shows subcapsular haemorrhages. In six normal dogs the spleen was found to weigh 2.04 gm. per kilo of live weight. In eight bld dogs the weight rose to 3.91 gm. per kilo. The authors consider that this enlargement was not due to intercurrent infection, as both aerobic and anaerobic cultures were sterile, but to an elective process of vaso-dilatation of nervous origin. They consider the condition to be of diagnostic value.

SERRA²² describes structural changes in the myocardium of animals infected with rabies virus. They are of the nature of an acute interstitial and parenchymatous myocarditis and are more definite in animals inoculated with fixed than with street virus. The parenchymatous changes are degenerative in character leading ultimately to atrophy of the muscle cells.

TAKAYA,²³ in his 6th report on rabies in rabbits, describes the well known changes in the corpuscular ratios, and MASSIAS²⁴ contributes observations on the blood picture of a child who died of rabies but had not received treatment. The blood was examined one day before and one hour before death, and gave the same differential count in

²⁰ LOVEBERG (Konstantin). Rabies in Man. Microscopic Observations—*Arch Neurol & Psychiatry* 1928 Apr Vol 19 No 4 pp. 633-646 With 4 text figs [2 refs]

²¹ LEXCI (Pedro) & ESQUIVEL (Ricardo). Sobre la lesión no descrita en la rabia canina (esplenomegalia hemorrágica)—*Semanas Méd* 1928. June 1. Vol 35 No 3 (1797) pp 1553-1555

²² SERRA (Antonio). Lesiones miocárdicas nella rabia.—*Ciruj. Vet.* 1928. July Vol 81 No 7 pp 406-414 With 3 figs on 1 plate (Royal Inst. Veter Med Turin)

²³ TAKAYA (J). [The Experimental Studies of Rabies in Rabbits. Sixth Report—*Oriental J Dis Infants* 1928 July Vol 4 No. 1 [In J panos. English summary p 4] (Children Clinic, Imperial Univ., Kyoto)]

²⁴ MASSIAS (Charles). Rage virale non traitée préventivement. Etude cytologique du sang.—*C R Soc Biol* 1928 June 29 Vol 89. No. 27. pp 319-320 [1 ref.]

each case. Polymorphonuclears 85 lymphocytes 14 monocytes 0.9 eosinophiles and basophiles both zero. The figure obtained by the Arneeth method was 296 (for 100 cells) : i.e. a deviation towards the right.

From an examination of the sera of rabbits Hotta²⁵ using cooked antigen and glycerine extract considers that complement deviation is of no diagnostic value.

14 *Methods of Treatment* LEGEZYŃSKI and WEISSBROD²⁶ compare the immunizing effects of various methods of treatment upon 6 batches of 6 white rats and obtain inconclusive results. KOVIEFF and RANSINE²⁷ similarly have treated 7 batches of varying numbers of rabbits (in all 26 rabbits) by seven modifications and conclude from rather indefinite evidence that formalized and etherized vaccines are as potent as fresh. AJESZKY²⁸ from experiments on some thirty rabbits finds that the Budapest strain of fixed virus prepared according to the method of UMFANO and DOI loses virulence in four weeks at room temperature. Vaccine prepared according to the method of KONDO is inoffensive after keeping for 3 days at 37° but if kept at room temperature virulence may be maintained for 28 days. Again LEGEZYŃSKI and MARKOWSKI²⁹ find that of 9 dogs and 2 rabbits treated with Fermi's vaccine one died of rabies after a test dose of street virus whilst of 4 control rabbits none developed the disease.

VALLEE reviews BAILLY's work³⁰ on ether vaccines (Remlinger) to which reference has previously been made. In an interesting paper VOLPINO and FINOCCHIO³¹ describe experiments on the immunizing properties of nucleo-proteids extracted from rabies brains. The method of extraction was as follows. Fixed virus rabbit brains were rubbed into a paste in a mortar. Ether was added and after a period of 4 hours the emulsion was strained. The sediment so obtained was treated with a 1 per cent. solution of sodium hydrate and shaken for from 4 to 6 hours. The limpid opalescent supernatant fluid was decanted and precipitated with acetic acid. After standing for some hours the precipitate was separated, and suspended in physiological saline containing 0.25 per cent. carbolic. The acid was neutralized with a few drops of soda solution. The resulting suspension was innocuous to rabbits causing no local reaction nor pain. To test its

²⁵ Hotta (Tokitaka). Zur Diagnose der Lyssa mittels Komplementablenkung.—*Deutsches Archiv* 1928 Nov. 1 Vol. 41 No. 44 pp 1513-1514 [Federated States Anti Rabies Inoculation Inst. Vienna.]

²⁶ LEGEZYŃSKI (Stanislas) & WEISSBROD (Bronislas). Recherches expérimentales sur l'immunisation non spécifique contre la rage.—*C R Soc Biol* 1928 Sept. 18 Vol. 99 No. 26 pp 918-919 [1 ref.]

²⁷ KOVIEFF (D.) & RANSINE (S). Essais sur la vaccination contre la rage par le formol-vaccin.—*C R Soc Biol* 1928 Oct. 26 Vol. 99 No. 29 pp 1259-1261 [1 ref.]

²⁸ AJESZKY (A.). Ueber die Virulenz des Virus fixe in den karbolisierten Impfstoffen.—*Cent. f. Bakt. I. Abt. Orig.* 1928 June 20 Vol. 107 No. 6/7 pp 358-361 [16 refs.] [Royal Hungarian Veter. High School Budapest.]

²⁹ LEGEZYŃSKI (Stanislas) & MARKOWSKI (Sigismond). Recherches expérimentales sur la vaccination antirabique curative des chiens.—*C R Soc Biol* 1928 Sept. 18 Vol. 99 No. 26 p 916.

³⁰ BAILLY. Pratique de la vaccination des animaux contre la rage au moyen du virus-éther (méthode de Remlinger).—*Bull. Acad. Sci. de France* 1928 May Vol. 1 pp 180-183 [1 ref.]

³¹ VOLPINO (G.) & FINOCCHIO (M.). Sul potere vaccinante del nucleo-proteide nervoso nella rabbia.—*Riforma Med.* 1928 Sept. 17 Vol. 44 No. 38 pp 1205-1206 [Hyg. Inst. Univ. Messina.]

immunizing properties six rabbits were given the equivalent of 5 gm. of nerve substance over a period of 3 or 4 consecutive days. After 15 days a test dose of 1 cc. of fresh fixed virus was administered to these, and to six untreated control rabbits. Of the controls 5 out of 6 developed rabies whilst of the treated none were affected. The surviving animals were not refractory to massive doses of fixed virus given at a later date. A second experiment confirmed these conclusions.

REMLINGER and BAILLY²² extend their observations on local immunization (this *Bulletin* Vol. 25 p. 711). They argue that as the rabies virus is neurotropic, evidence of local immunity should be looked for in the nervous system. They refer to MARIE and MUTER-MILCH's observation that rabbits vaccinated by the meningeal route with ether vaccine became refractory to intracerebral inoculation of fixed virus (*loc cit* p. 709). In attempting to confirm these experiments the authors treated 19 rabbits intracerebrally with desiccated vaccine and 17 with ether vaccine on from 3 to 6 occasions. The test dose of fixed or street virus was introduced into the vaccinated, or the unvaccinated hemisphere. All the animals succumbed with the same incubation as that of the controls. There was no evidence of the least trace of immunity. They point out that their experiments differ from those of MARIE and MUTER-MILCH in that in the former treatment was intracerebral, whilst in the latter treatment was presented by the meningeal path. SAXCHIS BAYAKKI²³ has however failed to demonstrate immunity in 12 animals treated with ether and formal vaccines by the meningeal route.

PUNTORI²⁴ joins in the discussion regarding treatment by carbonized vaccines to which I referred in my last report (this *Bulletin* Vol. 25 p. 711 references 31 and 32.)

v. Statistics.

VIALA²⁵ reports that of 639 persons treated at the Pasteur Institute of Paris during the year 1927 none developed rabies. Amongst 1142 persons treated at SHILLONG²⁶ (Assam) during 1927 rabies developed in 11 persons or 0.61 per cent. of the total. The percentage of cases in which there was no visible lesion was 0.61 and the percentage of individuals who commenced treatment later than the first week was 38. DA VEIGA²⁷ reported that at the Pasteur Institute of Rio de Janeiro 1796 persons were fully treated during the year 1927-28.

²² REMLINGER (P) & BAILLY (J). La vaccination locale dans la rage: échec de la vaccination intracérébrale. (Deuxième mémoire)—*Ann. Inst. Pasteur* 1928, July, Vol. 4, No. 7 pp. 736-741 [3 refs.]

²³ SAXCHIS-BAYAKKI (V). Estudios de vacunación antirrábica del conejo por vía meníngea.—*Rev. Méd. y Biología* 1928, Sept. Year 5, Vol. 10, No. 57 pp. 47-52 [3 refs.]

²⁴ PUNTORI (Vittorio). Los distintos métodos en uso de las vacunas antirrábicas (enmendadas)—*Semana Méd.* 1928, July 28, Vol. 35, No. 30 pp. 239-241.

²⁵ VIALA (Jules). Les vaccinations antirrábiques à l'Institut Pasteur en 1927.—*Ann. Inst. Pasteur* 1928, June, Vol. 42, No. 6 pp. 724-725.

²⁶ ASSAM. King Edward VII Memorial Pasteur Institute and Medical Research Institute Shillong. The Eleventh Annual Report for the year ending 31 December 1927 (MORIMOV (J.) Director)—27 pp. 1928. Shillong Govt. Press [1a ed. 13 annes]

²⁷ DA VEIGA (Octavio A.). Prophylaxia da raiva a Rio de Janeiro.—*Folia Méd.* 1928, Oct. 15, Vol. 9, No. 28, pp. 42-43.

Of these two were classified as failures. At the *New Orleans* (U S A.) Charity Hospital 1,871 persons were treated from 1920 to 1928 (HAUSER³⁸) by the method of Harris. In 3 or 4 cases symptoms of paralysis were observed. From *Kasauli* (India) CUNNINGHAM³⁹ reports that during the year 1926 6 138 persons were treated at the Pasteur Institute and 2,234 at out-stations. The death rate amongst the former was 1.76 per cent. and amongst the latter it was 1.29. These figures are higher than those of former years. This apparent increase in death rate is due to the introduction of a rigorous method of following up cases for six months after completion of treatment in accordance with the recommendation of the International Conference. Definite information has been received as to 80 per cent. of the treated. The investigation into the efficacy of etherized vaccines is being steadily prosecuted, but results are not as yet available. The percentage with no visible lesions of Indians treated at Kasauli was 1.54.

vi. Paralytic Accidents

Two cases of paralytic accident which followed treatment with vaccine killed by carbolic acid are reported. The first by ALESSANDRINI⁴⁰ from Aquila, one of the dispensaries supplied by PUNTONI. The symptoms persisted for about six months and involved the whole trunk. The second is discussed by STUART and KRIKORIAN⁴¹ (Jerusalem) and occurred after treatment by Semple's vaccine. In this case symptoms involved the leg, the bladder and the rectum and recovery followed after about a month. STUART and KRIKORIAN have examined the general question of causation. Although they have succeeded in inducing the symptoms and post mortem appearances of anaphylactic shock in rabbits as a result of the action of foreign nerve material, they consider that paralytic accidents are not related to anaphylaxis. They have succeeded in inducing paralysis in 2 out of 15 rabbits inoculated with 280-672 mgm. sheep's brain substance in normal saline but not in 15 treated with sheep's brain which had been carbolized. From these and other experiments they have been unable to demonstrate any relation between occurrence of paralysis and elevation of dosage. To find whether homologous brain substance had the same effect as heterologous they treated 40 rabbits with fixed virus brain (rabbit) in saline and 40 with the same nervous material in carbol saline solution. Of the former group one developed paralysis of the latter none became paralysed. From their various experiments they conclude that though normal brain material may induce anaphylactic

³⁸ HAUSER (George H.) Rabies and its Preventative Treatment.—*New Orleans Med. & Surg. J.* 1928 June. Vol. 80 No. 12. pp. 794-804 [27 refs.] [Charity Hosp. New Orleans La.]

³⁹ KASAUJI. PASTEUR INSTITUTE OF INDIA. The Twenty Sixth Annual Report of the Central Committee of the Association and the Audited Accounts up to June 30th, 1927 also the Report of the Director of the Institute for the Year ending 31st December 1928 Part II [CUNNINGHAM (J.) Director.]—60 pp. Simla. Liddell's Printing Works.

⁴⁰ ALESSANDRINI (Alessandro). Un caso di paralisi acuta da vaccinazione antirabbica con vaccini fenicati a virus ucciso.—*Ann. d. Ig. e M.* 1923, July Vol. 38. No. 7 pp. 550-554 [8 refs.] [Anti Rabies Dispensary Prov. of Rieti. (Anti Rabies Inst. Rome.)]

⁴¹ STUART (G.) & KRIKORIAN (K. S.) The Neuro-Paralytic Accidents of Anti-Rabies Treatment.—*Ann. Trop. Med. & Parasit.* 1928 Nov. 9 Vol. 22. No. 3 pp. 327-377 [56 refs.]

shock, paralytic symptoms are not an anaphylactic phenomenon paralyzes are not due to fixed virus or to rabies toxin accidents follow the exhibition of brain substance whether normal or rabid they are equally induced by homologous and heterologous nerve substance the cause lies in some constituent of normal brain substance which is rendered innocuous by the action of 1 per cent. phenol. The actual occurrence of accident is governed by predisposition or idiosyncrasy *

VAN DEN HOVEN VAN GENDEREN⁴² discusses the accidents which occurred during the period 1896-1908 by the Rumanian method (Piscarin). She points out that these vaccines were not dead, and supports this by experiments showing that emulsions heated for 15 minutes at 50-60 are still virulent. During the period 1896-1908 the dosage was high and the proportion of accidents was 1 in 260. After 1908 though the periods of heating were altered the dosage was reduced to one tenth and accidents ceased. She concludes that the high dosage and not the effect of heating was the important factor in inducing paralyzes. She holds strongly to the view that there is a definite relation between the prevalence of accidents and high dosage of fixed virus.

Three papers deal with QUAST's contention that fixed virus may be found in the brains of individuals who have been killed or have died from intercurrent causes, during or after treatment with a live virus. DAVID⁴³ has obtained negative results in the case of the brains of 5 dogs and 8 guineapigs which had been treated with a single dose of 1 to 2 gm. of living virus, and were killed eight months later. REMLINGER and BAILLY⁴⁴ in five series of experiments on some 33 animals, which had received large doses of fixed virus obtained consistently negative results. Two of these animals, a dog and an ass had received doses amounting to 25 and 9 rabbit brains respectively. VAN DEN HOVEN VAN GENDEREN and DIK⁴⁵ add the results of experiments on monkeys, 3 of which received a series of doses amounting in each case to 161 mgm. 3 received 212 mgm., 4 received 325 mgm., and 4 received 1019 mgm. Of 108 guineapigs inoculated with the brains of these monkeys, killed at periods of from 1 to 6 days after completion of treatment, none developed rabies.

In this paper the reviewer is referred to as having upheld the anaphylactic origin of paralytic accidents at the International Conference the statement being based upon REMLINGER's official summary. A correction is necessary. I said that in 1907 HARVEY and I put forward the view that these accidents were due in some way to normal brain substance and might be an anaphylactic phenomenon. I added that in the light of recent experiments this explanation was inadequate.

A. G. McA.

⁴² VAN DEN HOVEN VAN GENDEREN (Jeanne). Die erwärmten Virus fix-Emulsionen von Piscarin und die danach aufgetretenen Lähmungen.—*Cent f. Bak. I Abt. Orig.* 1928 Sept. 28. Vol 108 No. 7/8. pp. 430-432. [3 ref.] [Pasteur Inst. Bandung, J. a.]

⁴³ D VID (Hana). Leber des Vorkommen von Wutvirus im Gehirn schutzgeimpfter gesunder Tiere. I. Mitteilung.—*Cent f. Bak. I Abt. Orig.* 1928 July 25. Vol 108 No. 1/4. pp. 49-52. [9 refs.] [Veter High School Vienna.]

⁴⁴ REMLINGER (P.) & BAILLY (J.). Le virus fixe ne passe pas dans le système nerveux central à cours du traitement intracérébral.—*Ann. Inst. Pasteur* 1928 July. Vol 4. No. 7. pp. 729-735. [8 refs.]

⁴⁵ VAN DEN HOVEN VAN GENDEREN (Jeanne) & DIK (J. H.). Zur Frage des Vorkommens von Virus fixe im Gehirn bei der Antirabiebehandlung.—*Cent f. Bak. I Abt. Orig.* 1928 July 25. Vol 108. No. 1/4. pp. 55-57. [3 refs.] [Pasteur Inst., Bandung, Java.]

vii. Rabies in Animals

AUJESZKY⁴⁶ reports from Hungary that during the last 25 years 9 328 animals were vaccinated against rabies by the method of Högyes of which 184 (2 per cent.) developed the disease.

MEISSNER and BAARS⁴⁷ criticise HERRMANN's article on obligatory protection of dogs (this *Bulletin* Vol. 25 p. 714) in which he stated that a single dose of fixed virus as large as it is safe to administer without running undue risk of conveying infection fails to give adequate protection. Using Lyssin on 81 dogs none in the author's hands developed inoculation rabies. A discussion⁴⁸ on the vaccination of dogs opened by DR. STINSON is reported in the United States Public Health Bulletin. BAILLY⁴⁹ discusses treatment of animals by ether vaccine and advocates its use.

viii. Miscellaneous

HERRMANN⁵⁰ from the examination of the brain of the foetus *in utero* in various cases human and other finds that the virus of rabies can be transmitted through the placenta. The virus so obtained is somewhat reduced in virulence. He also found⁵¹ that the saliva of a boy who developed rabies during treatment was infective.

LEGZYSKI and MARKOWSKI⁵² discuss the possible existence of rabies carriers. Of 6 dogs which proved refractory to a test dose of street virus after treatment with Fermi's vaccine were killed four months after completion of treatment. Rabbits were inoculated with brain pancreas and salivary glands but none developed rabies: i.e. none of the dogs were carriers.

DI VESTEA⁵³ refers to the classic experiments by which he with ZIGARA (1886-1890) demonstrated the propagation of the virus along the nerve trunks. In 1894 he described corpuscles in nerve fibres which are not essentially different from Negri bodies. In these days he arrived at the view that the parasite of rabies existed in nature in two phases

⁴⁶ AUJESZKY (A.) [Données statistiques sur la vaccination antirabique en Hongrie]—*Allat Lapok* 1926 No 22 p 283 [Summarized in *Bull Inst Pasteur* 1928, Oct 31 Vol 26 No 20 p 926]

⁴⁷ MEISSNER (H.) & BAARS (G.) Entgegnung zu dem Artikel von Dr Otto Herrmann Ueber einmalige obligatorische Schutzimpfung der Hunde gegen Tollwut.—*Cent f Bak I Abt. Orig* 1928 Sept. 26 Vol 108 No 7/8 pp 433-437 [2 refs.]

⁴⁸ TRANSACTIONS OF THE 24TH ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH OFFICERS WITH THE UNITED STATES PUBLIC HEALTH SERVICE Vaccination of Dogs against Rabies—*U S Public Health Bull* No 187 1927 Feb pp 63-76

⁴⁹ BAILLY (J.) [Contribution à l'étude de la vaccination antirabique des animaux domestiques. Emploi du virus-ether]—*Thèse Doct vétér* Lyon 1928 June 73 pp Impr Bosc et Riou [Summarized in *Bull Inst Pasteur* 1928 Oct 31 Vol 26 No 20 pp 928-929]

⁵⁰ HERRMANN (Otto) Placentare Übertragung der Wut.—*Ztschr f Immunol* u. *Experim Therap* 1928 Vol 58 No 3/4 pp 371-383 [18 refs.] [Kasan State Inst for Med Advancement Kasan.]

⁵¹ HERRMANN (Otto) Lyssavirus im menschlichen Speichel.—*Ztschr f Immunol* u. *Experim Therap* 1928 Vol 58, No 3/4 pp 384-388 [16 refs.] [Kasan State Inst. for Med Research, Kasan.]

⁵² LEGZYSKI (Stanislas) & MARKOWSKI (Sigismund) Recherches expérimentales sur les porteurs éventuels de germes rabiques.—*C R. Soc Biol* 1928 Sept 18. Vol 99 No 28 p 917 [1 ref.]

⁵³ DI VESTEA (Alfonso) [Neurotropismo del virus rabido e sua probabile natura protozoaria a duplice fase di vita]—*Ann d Univ Toscane* Vol 11 No 2 With 1 fig [Summarized in *Bull Inst Pasteur* 1928, July 13 Vol 26 No 13, p 602]

SMITHIES (Frank). Parasitosis of the Bile Passages and Gall Bladder. A Report upon 37 Instances of Protozoal Infestation and One Instance of Infestation by *Acanthamoeba americana*.—*Amer Jl. Med Sci* 1928. Aug Vol. 178. No. 2. pp. 223-253. [32 refs.]

The author refers to his first discovery (1917) of active *Giardia intestinalis* in a gall-bladder removed by surgery. The present report deals very fully with 37 instances of protozoan infestation of the bile-tract among 1,591 patients examined. Each drainage was continued on an average more than five hours after "metapyloric instillation" of solution (33 per cent.) of magnesium sulphate. In 18 cases parasites were not discovered at the first drainage operation, and in one instance not until the fifth. In the majority of cases—but not in all—the patients' stools contained cysts. The fact that in some cases protozoa are not found prior to drainage of the bile-tract (following stimulation of the duodenum by magnesium sulphate) is regarded as evidence that the protozoa discovered by this method were resident in the bile-tract, but the author also refers to 8 instances where subsequent to the discovery of protozoa by drainage their presence in the gall-bladder was finally verified in the contents of the organ after excision. The species observed in these 37 instances were *Chilomastix mesnili* in 25, *Entamoeba histolytica* in 5, *Trichomonas* in 6, *E. coli* and *Giardia* in 2 each. All the 37 patients harbouring protozoa in the bile-tract were ill, the usual condition being chronic bilious dyspepsia, or colitis with some sort of derangement or discomfort in the motions of the bowel. The eosinophil ratio was often affected, the average percentage being 4.1. The details of the clinical and laboratory observations in relation to the particular parasite infestation are given for each case, in a valuable table along with duration and results of individual treatment.

Locomotion of the parasites within the alimentary tract, in respect of local infestation and re-infestation, is discussed, the author being of opinion that although three-fourths of the patients were deficient in "normal" gastric acidity yet the deterrent influence of gastric acidity has been much overrated. His observations show that not only cysts of protozoa, but active forms also can resist the acidity of the stomach. Where acidity reached 38 *E. histolytica* was not found. The question of the influence of climate upon pathogenous behaviour is discussed. 18 of the 37 patients were born and bred in the south ("Southern immunes") and it was estimated from their histories that some must have harboured protozoa many years before they suffered from dyspepsia. Medical (non-surgical) treatment is discussed. Sixty per cent. of the cases treated medically and by drainage recurred, sometimes as many as three times.

A. A.

SMITHIES (Frank). Present-Day Treatment of Intestinal Protozoasis and Factors that Determine its Efficacy.—*Jl Amer Med Assoc* 1928. July 21. Vol. 91. No. 3. pp. 152-157. [13 refs.]

This is a general review of the subject of intestinal infestation by pathogenous protozoa. The author contrasts the urgent and acute results of such infestation in the tropics with the obscurer and more chronic effects usually occurring in non-tropical countries—the latter being, in the main, the aspect that has come within his own personal

observation The greater part of the paper is devoted to the clinical management of such chronic infection and the value of the paper depends not on any novel range of facts or principle but on eclectic detail in the therapeutic sphere which cannot be condensed

A. A.

HEGNER (Robert) *The Evolutionary Significance of the Protozoan Parasites of Monkeys and Man.*—*Quarterly Rev Biol* 1928 June Vol. 3 No 2 pp 225-244 With 19 text figs [91 refs]
[Johns Hopkins Univ School of Hygiene Baltimore Md.]

This paper illustrates not the disagreeable practical applications of parasitology but one of the many pleasing philosophic applications of that subject The author enumerates and reviews in individual detail the species of protozoa parasites of man and of monkeys and in comparing the two catalogues he draws attention to the large proportion of valid species that (ignoring mere whims of a rather crude nomenclature) seem to be common to both Such close correspondences he notes are not found when the protozoan parasites of man are compared with those of any other mammals whose parasitic fauna has been studied He concludes, with a somewhat antiquated reserve that if the theory be valid that where two different species of hosts harbour closely related parasites those two hosts must have a common ancestry then the data reviewed in this paper furnish important evidence in favour of the hypothesis that monkeys and man are of common descent.

A. A.

KESSEL (John F) *Intestinal Protozoa of Monkeys.*—*Univ California Public Zool* 1928 Aug 11 Vol. 31 No 13 pp 275-306
With 24 figs. on 2 plates [54 refs.]

Entamoeba dysenteriae [histolytica] *E coli* *Endolimax nana* *Iodamoeba buetschlii* *Councilmania lasfleurs* *Giardia lamblia* *Trichomonas hominis* *Chilomastix mesnili* and *Embadomonas intestinalis* in every case structurally indistinguishable from the forms found in the human intestine have been recognized by the author in four species of *Macacus* monkeys and with the exception of *Giardia* and *Councilmania*, have been cultivated in the egg-serum medium in which those Protozoa have been cultivated from man Excystment of Nos. 1 3 4 and 8 and encystment of Nos. 1 and 2, were observed in culture from the monkey Monkeys were experimentally infected with Nos. 1 2 3 7 and 8 from man *E dysenteriae* of monkeys invaded the mucosa muscularis, submucosa and lymphatic nodules of the intestine of monkeys Kittens were experimentally infected with *E dysenteriae* of monkeys, both by cysts and trophozoites, per anum and the ensuing symptoms were similar to those that follow infection of kittens with *E dysenteriae* of man The author therefore concludes that the forms of the above-specified Protozoa found in monkeys are conspecific with those found in man And he also emphasizes the conclusion that the monkey should prove a very suitable animal for the experimental study of amoebiasis

A. A.

KESSEL (John F.) Intestinal Protozoa of the Domestic Pig.—*Amer J Trop Med* 1928. Sept. Vol. 8 No 5 pp 481-501
With 28 figs. on 2 plates. [13 refs.]

The intestinal protozoa here discussed were the issue of 160 samples of faeces from as many pigs brought to market in Peking. The species found were *Balantidium coli*, *Entamoeba polecki* of Prowarek (= *ensis* of Hartmann and *debilis* of Nieschulz) in 39 per cent. *Iodamoeba* in 42 per cent. and *Trichomonas*, both of them indistinguishable from the species occurring in man and four species resembling and probably identical with the *Entamoeba dysenteriae* and *coli*, the *Endolimax nana* and the *Chilomastix muris* of man—the first of these four in 20 per cent. the second in a single pig, the third in 14 per cent. and the last in 4.6 per cent.

Pigs fed (with all experimental precautions) on material containing the following cysts became correspondingly infected—*E. dysenteriae* of man and of monkey, *E. coli* of man, *E. nana* of man, and *Chilomastix muris* of man.

A. A.

CURRAY (J. A.) Experiments with the Use of Carmine Stains for the Detection and Differentiation of Intestinal Protozoa.—*Amer J Trop Med* 1928. July Vol. 8. No 4 pp 353-362. [5 refs.]
[Peking Union Med. College. Peking.]

[This paper which reviews classical methods of staining intestinal amoebae and records experiments in staining cysts and trophozoites with carmine, cannot be condensed. It describes the technique of deep staining with Harris haematoxylin and Best's carmine as giving the best results of all the methods tried. This method is said to take 91 minutes.]

A. A.

BRUMPT (E.) Differentiation of the Human Intestinal Amoebae with Four Nucleated Cysts.—*Trans Roy Soc Trop Med & Hyg* 1928. Aug 22. Vol. 22. No 2. pp. 101-114 [Parasit. Lab. Faculty of Med. Paris.]

Brumpt gives a very simple explanation of the proposition that although indigenous carriers of quadrinucleate amoeba-cysts are numerous in every country where they have been looked for, amoebiasis as a pathological process seems to originate almost entirely in the warmer regions of the globe. According to him the quadrinucleate cysts are of 3 species, only one of which, *E. dysenteriae* limited to the countries where liver-abscess is endemic, is pathogenic for man. The other two species, found all the world over are non-sanguivorous and non-pathogenic. Of these *E. dispar* the commoner is a minute form amoeba, having cysts quite comparable to *E. dysenteriae* and only to be distinguished by the results of inoculation into kittens. In *E. dispar* infection, if the kittens die there will be found at most only sparse microscopic patches of superficial congestion of the intestinal mucosa, without any thickening of the intestinal wall but it is more likely that they will recover after a short-lived infection with amoebae in whose cytoplasm red corpuscles are rarely observed. The other non-pathogenic species, *E. hartmanni* is even smaller than the minute

form of *E. dysenteriae* and its cyst can be distinguished both from *E. dysenteriae* and from *E. dispar* by the more voluminous siderophile masses in the cytoplasm. According to Brumpt amoebic dysentery occurring in Western Europe [i.e. outside the endemic area of *E. dysenteriae*] must be attributed to contamination from some one who has lived in hot countries where dysentery is endemic.

Warrington YORKE expressed his dissent from this very simple explanation of a very puzzling phenomenon and referred to reported experiments of his own when he had inoculated kittens with faeces from cases of indigenous dysentery in British youths of 18 or 19 years with results to some of the kittens that were not distinguishable from those produced in similar experiments with the excreta of chronic dysenterics from abroad. Of course since these youths (recruits) were in a camp in which there were people who had returned from France and from the East it could be demurred that they had been contaminated from abroad—but that line of argument did not obviate difficulties. He also referred to long-continued observations by ADAMS and himself showing that cysts of *E. dysenteriae* passed even by the same individual at different times differed very markedly in certain important respects and he also mentioned a case of a patient who constantly passed one-nucleated cysts (except on one occasion when a single binucleated cyst was seen) apparently all dead and indicative of conditions in that individual's gut inimical to the *histolytica* type of cyst.

Lyndhurst DUKE as a unicist pointed to the analogy of *Trypanosoma gambiense rhodesiense* and *brucei*. J. G. THOMSON'S studies had brought him to the conclusion that indigenous carriers of *E. histolytica* cysts in England and America were a potential danger to the community and he alluded to certain circumstances influencing pathogenesis—e.g. alteration of virulence by rate of transmission from host to host, amount of infective dose and nature of the bacterial environment in the host's gut. WENYON also—a unicist who however separates *E. hartmanni*—alluded to the possibility of alteration of virulence in the course of a long succession of transmissions as an explanation of the different behaviour of *histolytica* and *dispar*. Brumpt replying, affirmed his belief that things that seem identical may be different, and *vice versa* and he stated that in his observation the characters and behaviour of *E. dispar* had remained unaltered through twelve successive transmissions and twenty subcultures.

A. A.

- i SMITH (Nannie M.) & BARRET (Harvey P.) The Cultivation of a Parasitic Amoeba from the Cockroach.—*Jl Parasit* 1928 June Vol. 14 No. 4 pp 272-273 With 5 figs on 1 plate. [4 refs.] [Lab. of Dr Harvey P. Barret, Charlotte N.C.]
- ii TALLAFERRO (William H.) A Note on the Amoeba of the Cockroach cultivated by Smith and Barret.—*Ibid* p 274 [1 ref.] [Dept. of Hyg & Bact. Univ. Chicago]

1. Describes the successful cultivation—continued in a succession of transfers over a term of 24 months—of an amoeba from a cockroach, in a medium consisting simply of 1 part of inactivated human blood serum and 19 parts of a 0.5 per cent. solution of NaCl. The after end of the hindgut of the cockroach is dissected out and macerated in a few drops of the culture medium, and portions of the mixture are placed in the bottom

of tubes containing more culture medium. The tubes are placed in an icebox and generally produce amoebae in five days.

h. The *Entamoeba* of the above study is determined to be *E. thomsoni* of Lucas (1927) of the *E. coli* alliance A. A.

CARTER (M. R.) & GREENWAY (D.) Ejemplares hematofagos de *Entamoeba coli*. [*Haematophagous E. coli*].—*Arch. Argentinos enferm. Aparato Digest. y Nutric.* Buenos Aires, 1928. Vol. 3 No. 5 pp. 689-672. With 5 text figs.

The authors describe "haematophagous amoebae having the characters of the species *Entamoeba coli*" observed by them and illustrate their text with four figures of the amoeba, including an enlargement (1800 diam.) of one stained with iron-haematoxylin. A. A.

GREENWAY (Daniel) *Dientamoeba fragilis* en la Argentina [*Dientamoeba fragilis* in the Argentina].—*Arch. Argentinos enferm. Aparato Digest. y Nutric.* Buenos Aires, 1928. Vol. 3 No. 36 pp. 897-900. With 3 figs.

A description of this parasite is given together with a camera lucida drawing showing its structure. Infection in the Argentine is rare the author having met with two cases only and he is unaware of any other recorded instances there. H. Harold Scott.

LYNCH (Kenneth M.) The Flagellated Protozoa of the Intestine. A Specific Analysis of the Conditions related to their Presence.—*Amer. J. Trop. Med.* 1928. July. Vol. 8 No. 4 pp. 345-352. [9 refs.] [Med. College of the State of S. Carolina, Charleston, S. Carolina.]

The subjects of this study included people—residents of Northern Texas, mostly adult—complaining mainly of chronic disorder of the alimentary tract. They furnished no evidence that diarrhoea was related in any way to the presence of *Trichomonas hominis* or *Chilomastix mesnili* or that constipation was related to the presence of the *Trichomonas* though it was common in persons harbouring the *Chilomastix*. Among 240 patients infested with intestinal flagellates there was no case of arthritis deformans. Fifty-six per cent. of those harbouring *Trichomonas* were city people, while 80 per cent. of those with *Chilomastix* and 91 per cent. of those with *Giardia* were country people. Infestation with *Giardia intestinalis* was more frequent in early life, and with *Chilomastix mesnili* in later life but with *Trichomonas hominis* no particular age incidence was observed. Lowered gastric acidity seemed to be favourable for *Chilomastix*. A clinical diagnosis of chronic cholecystitis was recorded in about twice as many persons infested with *Trichomonas* and *Chilomastix* as in persons free from flagellates. A. A.

SCHOUREMKOWA (A. I.) & LISOVSKY (L. L.) Contribution à la question de la culture des *Trichomonas*. [*The Cultivation of Trichomonas*].—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21 No. 8 pp. 651-654. [1 ref.]

The authors find that the medium of BORCK and DRONCHAY is not propitious for the cultivation of *Trichomonas*, probably they think

because the white of egg ingredient suffers such foetid corruption from the faeces added with the flagellates. This obstruction they moderate by adding animal charcoal to the solid substratum of the medium and by substituting simple saline solution for the Locke-albumin of the supernatant liquid. By these modifications they have kept cultures free from repulsive corruption for more than two months and although in these old cultures no signs of survival of *Trichomonas* have been found, yet the flagellate makes its appearance in sub-cultures from them. The authors therefore think that they are on the brink of a discovery of some resistant static stage or gemmule of the flagellate

A A

CLEVELAND (L. R.) *Tritrichomonas fecalis* Nov Sp. of Man its Ability to grow and multiply indefinitely in Faeces diluted with Tap Water and in Frogs and Tadpoles.—*Amer Jl Hyg* 1928 Mar Vol. 8 No 2. pp 232-255 With 3 plates [6 refs.] [Med School, Harvard Univ Boston Mass]

— The Separation of a *Tritrichomonas* of Man from Bacteria its Failure to grow in Media Free of Living Bacteria Measurement of its Growth and Division Rate in Pure Cultures of Various Bacteria.—*Ibid* pp 256-278. With 1 fig [18 refs.] [Med School, Harvard Univ Boston, Mass]

A sample of human faeces which had been placed in tap water was found to contain amongst other protozoa a trichomonas which remained constantly present for 8 months. As the origin of the trichomonas was in doubt other samples of faeces were obtained from the same case and placed in tap water with the same result. On 5 occasions a sample of the faeces was divided into 2 parts one of which was heated. Both parts were then placed in sterilized tap water. On each occasion trichomonas appeared in the culture made from unheated faeces but not in the other. When trichomonas from a faecal culture was introduced into the negative heated faeces culture growth took place. Though direct examination of the faeces on no occasion revealed trichomonas it was evident that the organism was present in the faeces in some form. An oral trichomonas from the same case failed to develop in the faeces medium. The faecal organism will survive in a faeces culture for at least a year and will grow in practically any fluid which supports bacterial growth. Red blood corpuscles yeasts starch grains and even metallic particles are ingested if added to the media. When grown anaerobically in pure cultures of certain bacteria the trichomonas becomes nearly as numerous as red blood corpuscles in whole blood. Reproduction by binary fission as also by multiple fission takes place. Attempts were made to cultivate trichomonas from many animals in the same way but *Tritrichomonas augusta* of the frog alone grew. This species is however twice the size of the one of human origin which is undoubtedly a distinct species for which the name *Tritrichomonas fecalis* is proposed. The human form will live and multiply over a wide range of temperature (-3°C to 37°C) while *T. augusta* is killed in a few hours at 37°C .

By an elaborate process of washing with a serum saline medium and use of the centrifuge it was possible to obtain fluid which contained living trichomonas but no bacteria. Finally a culture of the organism was obtained in serum-saline medium in the presence of a pure culture

of a bacterium which appears to be nearly related to *Serratia ruber* (Zimmermann). If such a culture is heated to 36°C the bacteria are killed but not the trichomonas, so that it was easy to inoculate the flagellates into pure cultures of other bacteria. By use of these pure strains it was demonstrated that the organism would not grow without bacteria, that it grew well with certain bacteria, poorly with others and not at all with some. An attempt to find a substitute for living bacteria in the shape of dead bacteria or other materials failed. It is clear that this easily cultured trichomonas affords an opportunity for study of many of the characteristics of the flagellates of this group.

C. M. Wenyon.

CLEVELAND (L. R.) The Suitability of various Bacteria, Molds, Yeasts, and Spirochaetes as Food for the Flagellate *Trichomonas faecalis* of Man as brought out by the Measurement of its Fission Rate, Population Density and Longevity in Pure Cultures of these Microorganisms.—*Amer Jl Hyg.* 1928. Nov. Vol. 8. No. 6. pp. 990-1013 [5 refs.] [Med. School, Harvard Univ. Boston, Mass.]

The author explains how he obtained pure cultures of his recently described *Trichomonas faecalis* and how he tried their appetite for 42 several kinds of microbes (bacteria moulds yeasts, and spirochaetes) offered as food. He finds that the said trichomonas is "somewhat of an obligate anaerobe" that although it undoubtedly came from man it fails to grow with that is, feed on, most of the common bacteria of the human intestine and that it grows extremely well with *Aerobacter aerogenes* but extremely poorly with certain other specified microbes and he infers from this last fact that its great abundance in certain individual hosts and its great paucity in others is thereby explained. The results of his feeding experiments are tabulated.

A. A.

RATCLIFFE (Herbert L.) The Numbers of Trichomonads in Rats on Diets of Different Protein Content in Relation to the pH and Bacteria in the Cecum.—*Amer Jl Hyg.* 1928. Nov. Vol. 8. No. 6. pp. 910-934. With 1 text fig. [17 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ. Baltimore, Md.]

Studying the effect of varying intestinal conditions upon the intestinal parasites HEGNER found that rats kept on a diet poor in protein harboured large numbers of trichomonads which were rapidly decreased by a diet rich in protein. The author experimenting with rats and *Trichomonas muris*, finds that the numbers of these flagellates vary inversely with the numbers of proteolytic anaerobes in the rat's intestine that the multiplication of these anaerobes there is furthered by a diet rich in protein and that of the proteins tested casein was more effective than beefsteak, and beef liver was of no account. He also finds that an intestinal flora predominantly aciduric (as on a carbohydrate diet) is not necessary for the development of heavy trichomonad infections and that the pH of the intestinal contents is affected by the nature of the food, although not apparently in such a way as to influence changes in the flora.

A. A.

KESSEL (John F) *Trichomoniasis in Kittens.*—*Trans Roy Soc Trop Med & Hyg* 1928 June 30 Vol. 22. No 1 pp 61-80 With 14 figs on 4 plates [17 refs] [Peking Union Med College Peking China.]

In the course of a study necessitating the use of a large number of kittens the author happened to meet with 9 that were naturally infected with a *Trichomonas* morphologically similar to *T. hominis* and not appreciably different from the cat *Trichomonas* described and figured by BRUMPT. Most of these kittens had enteritis and wasted and died and after death the mucosa of their large intestine was found superficially inflamed and necrosed infiltrated with the trichomonas and in some cases superficially ulcerated. Cultures of *Trichomonas* from these kittens were transferred both *per os* and *per anum* to clean healthy kittens and in some cases their ingestion was followed by symptoms of enteritis and by similar pathological phenomena in the mucosa of the large intestine of the latter. Again trichomonads from cases of diarrhoea in man were transferred to clean kittens with the result that the latter showed the same symptoms and lesions as the kittens found naturally infested with *Trichomonas*. Clean kittens were also experimentally infected with *Trichomonas* from monkey white rat and domestic pig.

From the facts thus established the author concludes that the trichomonads that have been found in cats by various observers may be infections derived naturally from other animals rather than a *Trichomonas* specific to the cat.

A A

HOGUE (Mary Jane) *Trichomonas in Tissue Cultures.*—*Amer J Trop Med* 1928 July Vol 8 No 4 pp 325-337 With 24 figs on 3 plates. [3 refs] [School of Med Univ of Pennsylvania Philadelphia]

With a view to investigating their pathogenic possibilities the author introduced 5 species of *Trichomonas* and 1 of *Pentatrichomonas* into cultures of tissue (epithelium, fibroblasts nerve fibres) from the stomach and intestine of the embryo chick. Although the flagellates frequently came in intimate touch with the tissue-cells they were not observed to do the cells any mechanical injury.

A A

ISHIDA (I) [A Case of *Trichomoniasis* of an Infant.]—*Oriental J Dis Infants* 1928. Sept Vol 4 No 2. [In Japanese English summary pp 5-6 With 5 figs] [Pediat Clinic Imperial Univ Kyoto.]

The infant suffered from vomiting and had slimy greenish evacuations in which *Trichomonas* and a spirochaete were found and it was cured in 20 days by a daily enema of a 0.5 per cent. solution of quinine hydrochloride.

A. A.

MARTENS (A. H. A.) & KOERS (Cornelie H.) Over *Lambia intestinalis* [*Lambia intestinalis*].—*Nederl Tijdschr v Geneesk* 1928 Aug 4 72nd Year 2nd Half No 31 pp 3781-3786 [2 refs]

A woman, 25 years of age suffered for a year from attacks of abdominal pain followed by diarrhoea with slimy evacuations without blood. *Giardia*

intestinalis was found in the stools in great, but varying, numbers. In certain cases, like the one under consideration, some connexion between the symptoms and the presence of the parasites cannot be denied. Whether this connexion is primary or secondary is difficult to say yet it appears probable that a pre-existing intestinal disturbance may constitute a favourable factor for the parasites development.

In four instances the authors counted the number of parasites in the duodenal juice before and after the magnesium sulphate test of Meltzer-Lyon. In all instances the number of parasites was found considerably less after the test, i.e. after the admixture of pure bile with the duodenal contents. This is against the gall bladder being the original site of the infection.

The attempts to treat the condition by means of calomel, santonin, salol, emetine injections yielded no results. Then arsenical preparations were administered and the duodenal juice tested before and after their administration for the presence of arsenic (quantitative estimation) and for the number of parasites. Arsenicals apparently have an antiparasitic effect, which is, however only temporary (neo-salvarsan). The most practical way therefore appears to be administration of small doses over a long time. Stovarsol may be a suitable preparation for this purpose, but it also failed to produce a lasting success in the authors case though given during six months.

W. J. Bala.

LWORY (Marguerite) Action favorisante du sang sur la culture du *Leptomonas denocephalis* Fanth. (Flagellé trypanosomide) [Favouring Action of Blood in the Culture of *L. denocephalis*].—C. R. Soc. Biol. 1928. July 13 Vol. 99 No. 24 pp. 472-474 [6 refs.] [Pasteur Inst. Paris]

Being dissatisfied with broth as an ingredient of varying composition for culture media the author has been cultivating *Leptomonas denocephalis* in 2 per cent solutions of various peptones in normal saline (or Locke solution without glucose or Ringer's or Amar's solutions) with the addition, of course of defibrinated (rabbit) blood. Peptones of fibrin, silk, casein, and defatted casein, Witte peptone and solutions of albumose were not satisfactory but extremely good cultures were invariably afforded with Chapoteaut peptone. These appeared 6 to 8 days after inoculation, persisted in abundance for 45 to 60 days, and were easily subcultured. Attempts to cultivate in the peptone solution alone without blood were unsuccessful but a first culture was successful with the addition of 1 part of blood per 10 000 from this a subculture was possible with 1 part of blood per 1 000 and from this again a poor culture was obtained with 1 part of blood per 500.

A. A.

SHORTT (H. E.) & SWAMINATH (C. S.) Preliminary Note on Three Species of *Trypanosomidae*.—Indian J. Med. Res. 1928. July Vol. 16. No. 1 pp. 241-244 With 1 plate. [5 refs.]

Typical aflagellate *Leishmania* elements were found in the peripheral blood of a gecko (*Hemidactylus* sp.). Cultures made from liver gave an abundant growth of typical *Leptomonas* forms. A brief description of the parasite is given and it was identified as *Leishmania hemidactyli* (Mackie, Gupta and Swaminath (1923)).

The authors have also re-examined the *Crithidia* found in *Phlebotomus minutus* by MACKIE GUPTA and SWAMINATH and, as the result of experimental work have shown that it is really a stage in the life-history of a trypanosome of the lizard. Whether this trypanosome is actually the *T. hemidactyli* of Mackie, Gupta and Swaminath is not quite certain as the parasite found by the authors in their experimental gecko showed definite morphological differences from *T. hemidactyli*.

Two white mice and a guinea pig were inoculated intraperitoneally with the gut contents of eight *Triatoma rubrofasciata* collected in Assam and containing *Crithidia conorhini* Donovan 1909. Both mice showed trypanosome infection of the peripheral blood. The *Triatoma* in Assam is comparatively common in village houses and the immature forms of all stages are most commonly met with in the nests and boxes of pigeons which many villagers keep. It is possible therefore the parasite may be that which has been reported from pigeons but on the other hand the close resemblance of *T. vesperilionis* to *T. cruzi* suggests the possibility that a bat may be the vertebrate host. Further work on the three parasites is in progress.

W. Yorke.

GIORDANO (MARIO) Sulla presenza di flagellati nel polmone umano [Flagellates in the Human Lung].—*Arch Ital Sci Med Colon* 1928 June Vol 9 No 6 pp 346-354 With 2 text figs & 31 coloured figs on 1 plate [Inst. of Colonial Path Univ. Bologna.]

The patient, a man of 39 had fever and cough with sputa nummular fetid and sometimes blood streaked. No tubercle bacilli, but abundant spirochaetes with fusiform bacilli and cystic forms some phagocytosed which the author regards as cysts of *Chilomastix mesnili*. Sputum was injected under the skin of a rat which developed an abscess containing flagellates. He suggests the suitability of subcutaneous tissue of the rat for culture of this parasite.

H. Harold Scott.

TSU (TAIEN YUNG) Ein Fall von *Proctoschia asiatica* [A Case of *P. asiatica* Infection].—*Arch f Schiffs u Trop Hyg* 1928 Sept Vol. 32 No 9 pp 487-488 With 1 text fig.

The author describes and figures flagellates determined as *Proctoschia asiatica* in the stools of a case of chronic dysentery that had been unsuccessfully treated with emetine but was now cured in a few days with spirocide tablets (stovarsol).

A. A.

PAWAN (J. L.) *Phytomonas davidi* in *Euphorbia pilulifera*, Trinidad. —*Jl Port-of Spain Med Soc* 1927 pp 159-165 With 3 coloured plates [3 refs.]

Euphorbia pilulifera is a common annual in Trinidad and the author has found both it and the salivary glands of the bug *Orihessa serrilleri* that feeds on its leaves and flowers infected with *Phytomonas davidi*. Infected leaves are distinguished by their smaller size and reddish-brown discoloration.

A. A.

CORCUFF (Charles). Recherches sur la spécificité parasitaire des coccidies. [The Specificity of the Coccidia].—Ann. Parasit. Humains et Comparés 1929. Oct. 1 Vol. 6. No. 4 pp. 404-418. [25 refs.] [Parasit. Lab., Faculty of Med., Paris.]

UHLHORN having recorded the successful experimental infection of chickens with the coccidium of the rabbit the author here reports his inability to confirm that record. The author fed a series of carefully tended chickens, of ages ranging from one day to 32 days, with big doses of carefully collected and completely segmented oocysts of *Eimeria stiedae* obtained from rabbits livers, but in no case did he observe any infection of the birds—or anything but a speedy elimination of the unchanged oocysts in the faeces. The paper is introduced with a historical résumé and concluded with a good bibliography

A. A.

CARINI (A.) Um caso de coccidiose intestinal humana por *Isospora belli*, observado em S. Paulo. A Case of Infection with *Isospora belli*, occurring in S. Paulo.—Bol. Biol. S. Paulo 1928 Sept. 22 No. 13 pp. 79-80. 2 refs.]

The patient a child of 4 years, still—after treatment for pyuria and worms—complained of abdominal pain, and passed irregular stools, loose and pasty at times and containing mucus, oocysts of *Isospora belli*, a few motile dysentery amoebae, occasional flagellates, and ova of *Trichuris*. Subsequently all except *Isospora belli* persisted but some weeks later [treatment is not stated] the child became quite well. The development of the oocysts was watched under the microscope. To what extent the coccidia contributed to the condition could not naturally be determined. This is said to be the second case of human coccidiosis observed in Brazil, the first being recorded in 1925 by PINTO and PACHECO at the Oswaldo Cruz Institute

H. Harold Scott.

LEGER (Marcel) *Plasmodium* du *Cercopithecus callitrichus* de l'Afrique occidentale. [Plasmodium of West African *Cercopithecus callitrichus*.]—Ann. Inst. Pasteur 1928. July Vol. 42. No. 7 pp. 70-781. With 1 text fig. [18 refs.]

Plasmodium j. ruxi is described as a new species parasitic in the West African *Cercopithecus callitrichus*. The author has followed an infection for a term of eight months. Its appearance in the peripheral circulation is very irregular no rhythm being evident. The schizonts have no definite cycle one can only say that they appear less often and remain a shorter time visible than the gametocytes. The gametocytes, which are slightly larger than a red corpuscle also are very irregular they appear for varying terms at irregular intervals and disappear again for varying terms. The young trophozoites have not the signet-ring shape, their cytoplasm is more like a sausage occupying about two-thirds of the circumference of a ring the older parasites are very actively amoebiform, sometimes having a reticulate (spider web) appearance. schizogony has not been observed in the peripheral circulation. Parasitized red corpuscles are not enlarged, nor have Schuffner's granules or Maurer's spots been observed. The infected monkey has slight attacks of fever (oscillating about 36° C.) from time to time but is not upset by them these irregular attacks are abrupt in onset, of brief duration, and of sudden ending

A. A.

COWDRI (E V) & COWELL (W P) Etudes cytologiques sur le paludisme Deuxième mémoire. Rapports quantitatifs entre les gamétocytes femelles et les gamétocytes mâles de *Plasmodium kochi* [Quantitative Relations between Female and Male Gametocytes of *P kochi*].—*Arch Inst Pasteur de Tunis* 1928 June Vol. 17 No 2. pp 147-156 With 3 graphs in text [14 refs]

This is a statistical study of chronic infection of *Plasmodium kochi* of monkeys. The following phenomena are noted (1) a rhythm of about 24 hours duration in the number of gametocytes (2) a more or less synchronous variation in the size of the gametocytes (3) in measurements of 1 900 gametocytes an excess of about 0.043 μ in the female over the male cell in a count of 9 500 gametocytes an excess in the proportion of 10 to 8 in the number of the females and a curious oscillation in the proportion of the male and female gametocytes

A. A.

COWDRI (E V) & SCOTT (G H) Etudes cytologiques sur le paludisme III Mitochondries, granules colorables au rouge neutre et appareil de Golgi. [Cytological Studies on Malaria].—*Arch Inst Pasteur de Tunis* 1928. Sept Vol. 17 No. 3 pp 233-252. With 25 coloured figs on 1 plate [27 refs] [Pasteur Inst Tunis & Rockefeller Inst for Med. Research New York.]

For these very technical cytological studies *Plasmodium praecox* of bird-malaria was used. They cannot be compressed or abstracted but the following is their final conclusion That supravital staining with neutral red followed by treatment with osmic acid shows that granules taking the stain are disposed in linear series which fuse to form coloured bands and that under the influence of osmic acid these bands are blackened and eventually unite to form a typical Golgi apparatus. These observations are said to confirm strongly the theory of Parat that the Golgi apparatus might be formed by the confluence of droplets having an affinity for neutral red.

A. A.

PRITZE (Felix) Beiträge zur Kenntnis des *Balantidium coli* Das Balantidium des Schweines in seiner Beziehung zum menschlichen Balantidium und sein Verhalten unter natürlichen und künstlichen Bedingungen Inaugural Dissertation zur Erlangung der Doktorwürde genehmigt von der Philosophischen Fakultät der Friedrich Wilhelms-Universität zu Berlin [Balantidia of the Pig and of Man].—*Ztschr f Parasitenkunde* 1928 Vol. 1 No 3 pp 345-415 With 47 text figs. [Numerous refs]

Of the 70 pages of this inaugural dissertation on *Balantidium coli* 26 are occupied by familiar details of form and structure and 12 by a rather prolix account of the author's investigation of the conditions of its occurrence in the pig The organism was found in 66 per cent of 400 pigs examined—the active form occurring in 28.25 per cent the best intestinal medium being softish faeces with much undigested vegetable matter and a pH tenor of 6.4 it was not found in foetal pigs. The author's numerous observations confirm the opinion that

infestation is effected per os, by cysts though he does not dispute the possibility of the anal route by the active (vegetative) form. A great variety of artificial breeding media were tried, and in ammon fluid at room temperature the organism lived 474 hours. There is a copious bibliography with a conspicuous absence of any British name.

A. A.

MICHAÏLOWA (M. A.) & OUDINTZEW (G. N.). Contribution à l'étude de la balantidiose. [Note on Balantidiasis. — *Russian Jl. Trop. Med.* 1923. Vol. 6 No. 3 French summary pp. 207-208. [In Russian pp. 178-184 With 8 text figs. 40 refs.]]

In reporting a case of balantidiasis the authors review the history of this infestation in Siberia, where 16 cases have been recorded. They studied under the microscope the effect upon the ciliates (in vitro) of solutions of emetine in water and in blood, besides observing their behaviour in blood and in physiological saline the ciliates died *quickest in pure (? watery) solution of emetine*. It is noted that an English preparation of emetine nearly 14 years old had almost no effect.

A. A.

FRANCHINI (Giuseppe). Balantidiosi nell'uomo. A Case of Human Balantidial Infection. — *Arch. Ital. Sci. Med. Colon.* 1923. Aug. Vol. 9 No. 8 pp. 453-457 With 1 text fig. Inst. of Trop. Path., Univ., Bologna.]

A child of 4 years, with abdominal pain and loose motions containing blood and mucus. *Balantidium coli* was present in considerable numbers. Sigmoidoscopy revealed reddening and slight ulceration. Cure was rapid on stavarsol, 10 cgm daily by mouth, and enemata of ipecacuanha, 1 per cent.

H. Harold Scott.

SAÏTE MARIE (P. E. Flye). Organisme vivant de la *Sergentella hominis* trouvé dans des urines sanglantes. [Organism near *Sergentella hominis* found in Bloody Urine.] — *Bull. Soc. Path. Exot.* 1923. July 11 Vol. 21 No. 7 pp. 515-517 With 2 text figs. [Coccard Hosp., Fez, Morocco.]

The organism here described and figured was found, in some abundance in the urine of a Mahomedan about 40 years old who for two months on the present occasion (and for about 8 days some 2 or 3 years ago) had been the subject of a painless hæmaturia having no obvious ill effects although tenderness in the loins could be elicited, more particularly on the left side. It is a vermiform body 35 μ -85 μ long and 1 μ -1.6 μ broad. By Giemsa staining it shows a rosy cytoplasm, a coarse, usually subcentral, bluish lump (? nucleus) and a little clump of bright red granules in the distal and more attenuated third of the body. rarely two nuclei (?) are visible situated either in the anterior or the middle third of the body. E. SERGENT places the organism near *Sergentella hominis*.

A. A.

RAFFAELE (Giulio) Su di un microrganismo di dubbia natura rinvenuto in un preparato di sangue umano [On an Organism of Doubtful Nature, found in a Human Blood Film].—*Riv di Malariaologia* 1928 May-June Vol. 7 No 3 pp 267-270 With 1 coloured plate [English summary pp 405-406] [Experim Station Anti Malaria Campaign Rome]

The author describes and figures a parasite numbers of which were found in one preparation only in the blood of a four months child it is elliptical [elongate-elliptical with one end attenuated and pointed] and has a lump of chromatin either eccentric or near the middle

A A

STILES (C W) & HASSALL (Albert) Key-Catalogue of Insects of Importance in Public Health.—*Treasury Dept U S Public Health Service Hyg Lab Bull* No 150 1928, Mar pp 291-408

This valuable pamphlet of 118 pages represents Part 4 of Stiles and Hassall's Host Catalogue Index Catalogue of Medical and Veterinary Zoology. It is not a descriptive catalogue but is a reference index to the names zoological status and particularly recorded activities of the species of insects that are known (or believed) to influence in any way—be it even through the imagination—the public health. Those who are not accustomed to works of this kind will find instructions for using the catalogue in the Key Catalogue of the Protozoa reported for man which is Bulletin No 148 of the same series.

Insects of importance to the public health service are here alphabetically arranged under 17 general headings according to the obvious nature or venue of their importance as biters cadaver haunters controlling agents against other pests of dermatological consequence edible matter (chiefly by uncivilized tribes) excreta haunters food dwellers of jurisprudential import of laic lore and superstition, parasites and pseudoparasites pests in habitations and shops of divers kinds pinchers of poisonous interest polluters stingers of therapeutic significance and vectors (carriers intermediary hosts). That there appears to be a considerable disregard of logic in this classification is an undoubted merit in a work of this sort.

Within each of these 17 general headings the insect agents are arranged according to the particular method or sphere of their activity and therewithal and thereunder in their natural orders

A A

CARTER (H F) Report of the Medical Entomologist for the Year 1927 —*Ceylon Administration Rep Director of Med & San Services* 1927 Appendix pp C 62-C 70

This report contains full details of very careful local surveys of the anopheline fauna in Ceylon. An investigation was made during the north-east monsoon of the natural infectivity of the anophelines of villages and estates in the malarious low lying and coast tracts lying about twenty miles north of Colombo. Here the species found in huts cooly lines and cattle sheds were 4 *Culisacres* (much predominant) *A listoni* *A subpictus* *A barbarostris* *A hyrcanus* *A fuliginosus* *A jamesi* *A tessellatus* *A maculatus* and *A karrari*—the last seven species sparsely. Of 1440 specimens collected for dissection *A culisacres* constituting 80 per cent. of them this species was the only one found

naturally infected—the stomach in 16 and the salivary glands in 17 individuals. The breeding-places of these species were determined in pools, swamps, streams, puddles, earth-drains, coconut-trenches, borrowpits, and wells of various kinds. A malaria survey was carried out at the sanatorium and military training camp of Dryatalawa, 4,200 ft. Examination of hospital records and of children showed little evidence of malaria. The species of *Anopheles* here found were, in 8,256 larvae examined, *A. maculatus* 56.6 per cent. *A. jameai* 30.2. *A. hyrcanus*, 8.3. *A. listoni* 3.8 and collectively 1.1 per cent. of *barbirostris*, *vagus*, *tessellatus*, *atkinsi*, *calicifacies*, *fuliginosus*, and *gigas*. The first four species of this list were found from time to time in the houses and huts of the camp.

A. A.

BIDDLE (R.) Entomological Notes on the Canton Delta.—*Jl Roy Nat Med. Serv* 1928. July Vol. 14 No 3 pp. 190-200.

An interesting paper by an observant author. In the Delta the house-haunting *Culex fatigans* and *Stegomyia scutellaris* (*Aedes albopictus*) are the commonest of all the local species. *S. fasciata* (*A. aegypti*) was not found. The author notes a concurrence of dengue fever and *A. albopictus* in an island within the British concession in one particular year when the great majority of mosquitoes caught and bred there were of this species. The local *Anopheles* are *A. sinensis*, *A. barbirostris*, *A. maculatus*, *A. rossii*, *A. kochi* and *A. maculipalpis*. In the low lands of the delta 98 per cent. of the anophelines are *A. sinensis* the greatest numbers occurring in the winter. Locally all these species are said to prefer clean clear water and in summer when the Chinamen stir up the mud in the ricefields larvae of *A. sinensis* are seldom seen there. The author mentions a (well known) army of enemies of mosquito larvae the most active observed by him were the "water-boutmen" bugs and an *Anabas* fish. He has not observed *Phlebotomus* in the delta, but reports *Sanninum* to be common. Among Arthropods of medical interest he mentions a Solpugid and the popular delusion that it has a vesicant secretion. He attributes the mysterious eruption not to the Solpugid but to a small Staphylinid beetle of local occurrence.

A. A.

WOLLMAN (E.) ANDERSONS (Ch.) & COLAS-BELCOUR (J.) Recherches sur la conservation des virus hématophiles chez les insectes. (The Preservation of Haemophilic Viruses in Insecta.)—*Arch. Inst. Pasteur de Tunis* 1928. Sept Vol. 17 No 3 pp. 229-232. 4 refs.]

In his earlier experience (this Bulletin Vol 25 p 825) with houseflies reared by his aseptic method (*loc. cit.* Vol 18 p 200 and Vol 19 p 117) the senior author was struck by the rapidity with which such flies cleansed themselves from infection with *Trypanosoma imophorum* and the bacilli of Weeks and of Morax Axenfeld. These being organisms that must be cultivated in a medium containing blood or serum, the author speculates on the possibility of the want of the blood ingredient being the explanation of the phenomenon observed in houseflies. In

his present experiments comparing the relative infectivity of blood sucking flies (*Stomoxys*) with insects that do not feed on blood (*Musca*, *Lucilia* and cockroaches) and using *Spironema recurrentis* as the infective organism he finds that whereas the *Stomoxys* after feeding on an infected rat remains infective for 48 hours in the other insects fed on cultures the spirochaetes disappear quickly.

In other experiments an aseptically reared housefly fed on rich cultures of *Leishmania tropica* did not infect NNN medium to which it was transferred mashed 4½ hours afterwards.

A. A.

WEIDLING (Kurt) Die Beeinflussung von Eiröhrenzahl und -grösse einiger Dipteren durch Hunger im Larvalstadium mit einigen Beobachtungen ueber die Chaetotaxis der Hungertiere und ueber den Einfluss verschiedener physikalischer und chemischer Einwirkungen auf den Entwicklungsgang dieser Tiere (*Calliphora erythrocephala*, *Stegomyia fasciata* und *Anopheles maculipennis*) [Influence of Starvation on the Number and Size of Ovarian Tubules in the Larval Stage of Diptera.]—*Ztschr f angewandte Entom* 1928 July Vol. 14 No 1 pp 69-85 With 5 text figs [18 refs.] [Inst for Ship & Trop Diseases Hamburg]

The author whose observations are not entirely new [since he seems to be not aware of G. COUSIN's important work (see this *Bulletin* Vol. 23 p 871 and Vol. 24 p 432) on the effects of malnutrition upon the development of *Calliphora erythrocephala*] has studied the results of starvation in that species as well as in *Anopheles maculipennis* and *Stegomyia fasciata*. He notices that hunger prolongs the period of larval development and that adults from starved larvae are dwarfed and he observes further that the dwarfed females have fewer ovarian tubules and produce fewer eggs and furthermore that the larvae issuing from such eggs do not develop even if they be well fed into quite normal adults. This last observation was not demonstrated in the case of *Anopheles maculipennis* but assuming it to apply to that species the author thinks that it supports the opinion that the large and small forms of that species found in different places in Holland are distinct races. The author also has observed that the number of bristles is diminished in the dwarfed adults produced by starved larvae—a matter for consideration by taxonomists. He confirms the observations that strong light hinders the larval development of *Calliphora*, and that a large excess of males issues from a brood of hunger-stricken larvae. He observed that thymus and thyroid extract seemed to have no hormone effect upon the growth of his flies.

A. A.

HERMS (W. B.) The Effect of Different Quantities of Food during the Larval Period on the Sex Ratio and Size of *Lucilia sericata* Meigen and *Theobaldia incidens* (Thom.)—*Jl Econom Entom* 1928 Oct. Vol. 21 No 5 pp 720-729 [4 refs.]

Lots of blow flies (*Lucilia sericata*) resulting from maggots allowed to feed (on beef lung) to the full natural term showed a sex-ratio of

from 2.8-3.1 males to 6.9-7.2 females while other lots resulting from maggots allowed to feed for only 30-36 hours showed a ratio of 6.2-6.5 males to 3.5-3.8 females. On the other hand, with lots of mosquitoes (*Theobaldia incidens*) from larvae well-fed (on yeast, in distilled water) the ratio was 5.5 males to 4.5 females, while with other lots from larvae stinted of the same diet the ratio was 3.3 males to 6.7 females. Other details of length of wing are given.

A. A.

COOLEY (R. A.) *Montana's Laboratory for the Study of Insect Borne Diseases.*—*Amer Jl Public Health* 1928. Aug Vol 18 No 8. pp 893-898

"Probably there does not exist another research laboratory like the one of the Montana State Board of Entomology now nearing completion at Hamilton. Its aims are to study the insect-borne diseases of men and animals for the purpose of their eradication and prevention. The immediate problems are the ticks locally responsible for the spread of Rocky Mountain spotted fever, tularaemia and tick paralysis.

A. A.

BERTWISTLE (A. P.) *Antistreptococcal Serum for Insect Bites.* [Memoranda].—*Brit Med Jl* 1928 Aug 25 p 342.

Abstract of two cases of swift lymphangitis following fly-bite arrested and extinguished by injection of polyvalent antistreptococcal serum. It seems from the author's inquiries that *Stomoxys* is responsible for most of the fly bites that have fatal results in this country.

A. A.

FRANCHINI (Giuseppe) III nota entomologia sulle colonie italiane. [Third Note on the Entomology of the Italian Colonies].—*Arch Ital Sci Med Colon* 1927 July Vol 8, No 7 pp 363-368 [3 refs.] [Inst. of Trop Path. Univ. Bologna]

The species here said to be new to the record are *Anopheles superpictus* in *Libanica*, *A. mauritanicus* and *algeriensis* in Tripolitania and *Ornithodoros lakowensis* by no means uncommon in the oasis of Gadhames.

H. Harold Scott.

FRANCHINI (G.) Nuove osservazioni di entomologia nelle colonie italiane. [Fresh Entomological Observations in Italian Colonies].—*Arch Ital Sci Med Colon* 1928 Oct Vol. 9 No 10 pp 579-590. [Inst. of Colonial Path. Univ. Bologna]

Professor FRANCHINI continues his brief preliminary notes on the entomology of Tripolitania and Eritrea here noticing the *Lixodidae* and *Diptera Pupipara*.

H. Harold Scott.

IYENGAR (M. O. T.) *Mosquitoes in Relation to Disease. Instructions for Field Officers.*—16 pp. With 9 figs. Govt of Bengal, Public Health Dept. 1928. Calcutta. Bengal Govt. Press.

This little pamphlet is intended for sanitary officers in the field. It tells how *Culex Stegomyia* and *Anopheles* are differentiated, and

sketches their relations to certain diseases it describes the life-history of a mosquito very briefly and the procedure for collection of larvae and adults it deals discursively but practically with methods of destroying larvae and adults and it ends with a key for identifying species of *Anopheles* found in Bengal. The figures that illustrate the text are crude and those purporting to illustrate the equipment required for collecting and breeding mosquitoes may be fairly called grotesque

A A

FERMI (Claudio) L'ombreggiamento come radicale ed economico mezzo di disanofelizzazione e di lotta contro la malaria [Shade as an Economic Anti Mosquito Measure.]—*Malariologia* 1928 July 15 pp 19-25 [1 ref] [Hyg Inst Univ Sassari]

The author observing in Sardinia the absence of *Anopheles maculipennis* larvae from pools lying in permanent shade yet inhabited by *Culex* larvae recommends the sterilizing of potential *Anopheles* breeding places by artificial shade. He gives a list of 28 evergreens and 14 deciduous trees and shrubs that are suitable and describes the mode and the cost of planting such shade

A. A.

SENIOR WHITE (Ronald) Physical Factors in Mosquito Ecology Part II.—*Indian Jl Med Res* 1928 July Vol. 16 No 1 pp 11-30 With 2 text figs & 5 figs on 2 plates. [20 refs]

The interesting and well-digested investigations here recorded were made at Delhi and comprehended tanks irrigated land river floods rain pools and borrow pits. The author thinks that the detailed study of the composition of the plancton is useless unless it all be distinctly specific. As a warning he comments on the absurd results the Winkler process [for determination of dissolved oxygen] is liable to lead one in the presence of much nitrite. He is justified of some commonsense criticism of certain observers who have ventured to conclude that high temperature is the great destroyer of mosquito larvae in Nature. His present observations do not support his former conclusion that individual species live within definite ranges of H ion concentration. In the matter of conductivity he concludes that preference is a purely local phenomenon. The study of carbonates and albuminoid ammonia he has also found quite useless. He has found consolation however in a resuscitated paper where WADDELL (1903) showed that one part of strong liquor ammoniac in 4 000 is absolutely fatal to full-grown mosquito larvae and computed that a dilution of 1 in 30 000 should be inhibitive to new-hatched larvae. This has encouraged the author to pay further attention to the influence of saline ammonia which in his previous surveys he had observed to be inhibitory to natural water breeders particularly anophelines in amounts of less than 1 part per million. His present studies have confirmed that observation for anophelines except *A. rossii* in so much as to require him for all the disappointments of his studies. The paper should be read for its instructive methods and details.

A A

SENIOR WHITE (Ronald) On the Relationship existing between Carbonates and pH and Conductivity in Natural Waters.—*Indian Jl Med. Res* 1928 Apr Vol 15 No 4 pp 889-896. With 2 text figs. [9 refs.] [Central Malaria Bureau, Kasauli, India.]

In the course of a series of routine analyses of waters, in connexion with the study of mosquito breeding-places the author has observed the existence of very close relations between (i) the pH value and the percentage of the total carbonates present in what BURGE and JUDAY call free and half-bound forms, i.e. as CO_2 gas and as bicarbonate (which together may be summed up as movable carbonate) in contradistinction to the fixed carbonate and (ii) the total carbonate in all states, including dissolved free CO_2 , and the conductivity of the water as measured by a Kohlrausch bridge and cell. The evidence is tabulated and discussed.

A. A.

BLOW (T B) Observations on the Alleged Larvicidal Properties of Charophytes.—*Proc Linnæan Soc of London* 1928-27 Session 139 pp. 46-47

In the course of his two-months exploration of Madagascar for the purpose of investigating the Characeæ of the island, the author certainly noticed places of water in which Charophytes were growing freely and mosquito larvae were not to be found, and other places of water in which mosquito larvae were plentiful and Charophytes could not be found but in the course of exact experiments in England, extending over nearly a year he has come to the conclusion that the contrasted phenomena are not due to any antagonism between Charophytes and mosquito larvae. In the said experiments he has cultivated some of his Charophytes namely *Chara demissa*, *C. macropogon*, *C. delicatula*, *C. contraria*, *Leprothamnium papulosum* and *Najas opaca* and he finds that larvae of *Culex pipiens*, *Theobaldia annulata*, and *Anopheles maculipennis* in their company enjoyed a vigorous life, and a very large percentage attained to the winged insect. Extract of *Chara zeylanica* (also brought from Madagascar) was used with the same result.

A. A.

PRUTHI (Hem Singh) Some Insect and Other Enemies of Mosquito Larvae.—*Indian Jl Med Res* 1928, July Vol 16, No. 1 pp 153-157 [2 refs.]

In these experiments the natural enemy in each case was set among mosquito larvae in a pound jar of pondwater with a small quantity of waterweed. In these artificial circumstances favourable to the enemy the author observed, as enemies, besides numerous well-known forms, freshwater shrimps and crabs and the tadpoles of a common frog. He was also impressed by the fact that there was great mortality among larvae set in a jar of pondwater fouled by the excreta of an apple-snail. Similar mortality occurred with mollusks of other species, with the single exception of an *Indoplanorbis exustus*.

A. A.

- BARBIERI (Antonio) Sensibilizadores fluorescentes como larvicidas. Acción fotodinámica de la luz [Larvicide Power of Fluorescent Sensitizing Substances. Photodynamic Power of Light].—*Rev de Malariaologia* 1928. July-Aug Vol. 7 No 4 pp 456-463 With 1 text fig [English summary p 626.] Also in *Medicina Países Cálidos* Madrid 1928. Nov Vol 1 No 6 pp 523-530 With 1 text fig

The author states that certain fluorogenous substances of the order of phthaleins which absorb actinic rays possess a strong larvicidal power even in extremely weak solutions. The most potent of the many studied by them is Bengal Rose which is active even in a solution of 1 in 1 500 000 even in diffused sunlight. For practical purposes the authors suggest a solution of 1 in 500 000 the larvicidal action is observed in 24 hours.

A. A.

- HECHT (Otto) Ueber die Sprossspitze der Oesophagusausstülpungen und über die Giftwirkung der Speicheldrüsen von Stechmücken. [On the Blastomycetes of the Oesophageal Diverticula and on the Virulence of the Salivary Glands of Mosquitoes].—*Arch f Schiffs- u Trop Hyg* 1928 Nov Vol. 32 No 11 pp 561-575 With 7 text figs [37 refs] [Inst for Ship & Trop Diseases, Hamburg]

A general review of a subject that is still rather vague and for an accurate understanding of which as the author says comparative observations of the natural effects of the bite of different species of flies on different men are much to be desired. The author in culture preparations from at least 70 insects found yeasts in only three instances and he therefore concludes that these organisms find their way into the oesophageal diverticula from imbibed food and are not present as regular symbiotes.

A. A.

- PAWLOWSKY (E. N.) & STEIN (A. K.) with PERFILJEV (P. P.) Experimentelle Untersuchungen ueber die Wirkung der wirksamen Bestandteile der Mücke *Culex pipiens* auf die Menschenhaut [Effect of Active Constituents of *C. pipiens* on Human Skin].—*Ztschr f Parasitenkunde* Berlin 1928 Oct 27 Vol. 1 No 3 pp. 484-488 [Zool. Inst. Milit. Med. Acad. & Skin Clinic, State Inst for Med. Science Leningrad.]

The reaction upon the human skin of subcutaneous injections of saline emulsions of certain tissues of *Culex pipiens*—namely of salivary glands of oesophageal diverticula, and of crop (Magen) are compared in tabulated detail. The authors are convinced that the salivary secretion causes urticaria—quite apart from any question of contamination by micro-organisms.

A. A.

- LANGERON (Maurice) Les larves anormales de moustiques ou larves à collier et à cerceaux. [Abnormal Mosquito Larvae].—*Ann Parasit Humains et Comparé* 1928 July 1 Vol. 6 No 3 pp 273-283 With 16 text figs. [2 refs] [Parasit Lab Faculty of Med., Paris]

The author remarks the occasional appearance in Culicid larvae of duplications of divers adjuncts of the cuticle e.g. hairs that may remain

appressed to the cuticle in hoops or circlets or in *Anopheles* larvae a collar-like overgrowth of the after part of the head accompanied by duplication of some of the abdominal palmate scales. They may perhaps be explained as precocious developments anticipatory of a normal moult.

A. A.

BORRÉ (E.) Les moustiques de la Cochinchine et du Sud-Annam. [The Mosquitoes of Cochinchina and S. Annam].—*Arch. Inst. Pasteur d'Indochine* 1926 Apr-Oct No 3 & 4 and 1928 Apr No 7 pp 75-121 75-106. With 27 plates. [Numerous refs.]

This is a monograph of the mosquitoes of Cochinchina and South Annam with the usual synoptic tables of subfamilies and genera and species and individual specific descriptions of male, female, and larva. The author follows Neveu LEMARIE's treatment in five subfamilies—*Anophelinae* (*Culicinae*), *Megarthrinae*, *Uranotaeninae* and *Sabethinae*. The two present instalments contain but do not complete the account of the *Culicinae*.

A. A.

SHANNON (R. C.) & DEL POITE (E.) Los culicidos en la Argentina. [Argentina Culicidae. — *Rev. Inst. Bacteriológ.* Buenos Aires, 1927 Nov Vol 5 No. 1 pp 9-140 With 23 text figs. [134 refs.]

A descriptive catalogue of the Argentine Culicidae with keys and a bibliography.

H. Harold Scott.

FRANCINI (G.) Su di alcune specie di zanzare non ancora descritte nelle nostre colonie. [Species of Mosquitoes not previously found in Italian Colonies].—*Atti Ital. Soc. Med. Colon.* 1928. Aug. Vol. 8 No. 8 pp 458-459. *Inst. of Colonial Path.* Univ. Bologna.]

In the cases of Yauonga (Tripolitania) 4 *manwili* which at certain times of the year is the only *Anopheles* found, is undoubtedly the vector of malaria. *Aedes* *mauritanicus* and *argenteus* are also present. In Eritrea 4 *manwili* was and 4 *argenteus* and, in Somalia, *A. albopictus* were prevalent.

H. Harold Scott.

STILES (C. B.) Notes on Anophelines and Malaria in Kenya.—*Kenya & East African Med. Jnl.* 1928 Aug Vol. 5. No. 5. pp. 138-183.

An interesting record of 12 months work, from March, 1926, to April, 1927. The chosen breeding-waters of 11 local species of *Anopheles* are described in individual detail, and among statements of general interest it may be noted that larvae were never found in water that deposits ferric hydroxide. In all places *Anopheles gambiae* (= *costalis*) is the prevalent species. In Nairobi it is by far the commonest "domestic" species all the year round and there it finds breeding-grounds to its heart's content not only in irrigation channels of market gardens, but (during the rainy season) in the places provided

by unwitting man. It appears to be the chief malaria-carrier. Other domestic species in Nairobi and elsewhere are *A. christyi*, *A. cinereus* and *A. funestus* but none of them in anything approaching the numbers reached by *A. gambiae*. In Nairobi *A. christyi* was found in noticeable numbers only between August and January and *A. cinereus* only between September and January while *A. funestus* was only seen in houses between April and September and then only in numbers hardly worth notice. In some of the districts however the last named species—a notorious malaria-carrier—is abundant at times. In the control of mosquitoes in Kenya reliance is placed on oiling filling and drainage—and also (in smaller settlements) in taking warning from Nairobi where in the past so much was done unwittingly to perpetuate the breeding of mosquitoes.

A A

SCHWETZ (J) Quelques considérations sur l'aspect entomologique de la lutte antimalarienne au Congo belge. (Notes on the Entomological Aspect of Antimalarial Measures in Belgian Congo)—*Ann Soc Belge de Méd Trop* 1928 June Vol 8. No 1 pp 27-39 [4 refs.]

The author gives a list of 17 species and 3 varieties of Anopheles native to the Belgian Congo. The three commonest are *A. gambiae* (= *A. costalis*), *A. funestus* and *A. marshalli* var. *moucheti*, the two first being almost ubiquitous and the third abundant in many places. The breeding-grounds of *A. costalis* (the familiar name which the author prefers) are very varied and sometimes difficult to find, those of *A. funestus* are hard to trace even in places where the adults at certain seasons are found abundantly in houses and those of *A. marshalli* var. *moucheti* are not yet discovered and may be of a particular kind. The author therefore concludes that there can be no uniform and stereotyped method of defence against Anopheles but that the bionomy of each several species must be carefully studied as a necessary preliminary.

A A

ANAZAWA (K) [Studies regarding the Distribution and the Habits of Anophelines in Formosa.]—*Taiwan Igakka Zasshi* (Jl Med Assoc Formosa) 1928 May No 278 [In Japanese English summary pp 37-40] [Govt Research Inst & Soc of Investigation into Epidemic Diseases Formosa.]

Ten species of Anopheles are known in Formosa namely *A. sinensis minimus maculatus tessellatus fuliginosus splendidus katoru* [ludlowi] *plecau* [indesani] *candidiensis* [*A. comitus*] and a species with unspotted wings. All ten species are to be found in the secondary mountain ranges (300 to 1500 metres elevation) but at the greatest elevations (up to about 3000 metres) only *A. maculatus* and *plecau* may remain. On the foothills (below 300 metres) *A. minimus sinensis* and *tessellatus* are the species usually seen. On the plains these three and *A. katoru* on great plains of the sea-coast *A. sinensis* may be the only species. The house haunting species are *A. sinensis* and *minimus*.

A A

by unwitting man. In white vessels than from larvae from dark domestic species. The dark colouring generally was due to pigment in cinereus and A. f. as in the fat body. The author points out that the numbers received have no bearing upon the origin of races. A. A.

only seen in numbers ha. W) & SARDJITO (M.) Identification of the Bloodmeal of last-namederlands Indian Anopheles by Means of the Precipitin-Test In the cost Report)—Meded Dienst d Volksgezondheid in Nederl-ling adis 1928. Vol. 17 Pt 2. pp 234-250 [13 refs] learningk — Onderzoek naar den aard van het bloedmaal van perpiederlandsch Indische Anophelinen met behulp van de praeci-ritinen-reactie (Eerstemededeeling) — Geneesk Tijdschr v Nederl-Indi 1928 Vol. 68 No 2. pp 247-266 [13 refs] English summary pp 266-268 [Med. Lab Weltevreden]

The authors (who remind us that the precipitin test for the titification of the stomach-contents of mosquitoes was first employed Zonitz (WEIDANZ in 1908) prepared their precipitin sera by TEUKASAKI S // hod, in which the precipitate obtained in serum by alcohol is used th 30 intigen. The material tested consisted either of the mosquitoes pmselves or (much better) of the ingested blood preserved on filter tifier such material gave well defined reactions, even up to 10 m A ths afterwards. Many specimens did not contain enough blood at spond. It was not possible to distinguish certainly between blood e heap goat buffalo and cow. The following is the result of tests arva Anopheles captured in houses in Java. Of 13 A ludlowi 6 contained e at nan blood (of 28 captured in a buffalo-shed hard by 3 contained reati nan blood). Of 26 A rossi only 1 had human blood. Of a few n all specimens of A vagus and A tessellatus all contained buffalo blood. Of ur specimens of A sinensis the blood was human in 10 buffalo in 1 m bed chicken in 1. Of 4 A barbrostris all contained buffalo blood. Of a to A aconitus 2 contained human blood and 25 buffalo blood. (Speci both ens of A umbrosus A punctulatus and A bancrofti from other islands feed but no circumstances of capture stated—all contained human blood)

A. A.

A. A.

A. A. (K)

Anophelines V) & MITROPHANOVA (J) Sur l'écologie larvaire de Assoc Formosa maculipennis Mg (Quelques prémisses expéri summary pp 37 the Larval Ecology of Anopheles maculipennis tion into Epidemiolariolegia 1928. July-Aug Vol. 7 No 4 refs.] [Bact. Inst Perm U.R.S.S.] [English

Ten species of Anoph

minimus maculatus tessu.

Aleccan (Indesasi) candidion of these interesting studies of Anopheles spotted wings. All ten sphat the felicity of its larval stages is condi mountain ranges (300 to 1 sty and quality of the pabulum (plancton) elevations (up to about 3 000 the reaction, and the specific properties may remain. On the foothills (lat adversity in any or all of these four and tessellatus are the species ushemently catastrophic. Larvae may and A halorin on great plains of ater where the amount of dissolved only species. The house-haunting is at the saturation point or even as environment where the plancton

is at its worst and larvae have been observed to survive to the first moult even in bog-moss (*Sphagnum*) water of which the chemical reaction is the very worst. An ulterior conclusion suggests the greater importance of study of the conditions that determine the instinct of the pregnant female for a suitable breeding-place.

A. A.

DEMINA (N. A.) & NICOLSKY (V. V.) Sur le développement des larves d'*Anopheles maculipennis* Mg. en fonction de la valeur chimique des collections d'eau et sur l'affinité élective des femelles pour ces eaux au moment de la ponte. [Larval Development of *A. maculipennis*. Its Breeding Grounds.]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 7. French summary p. 452. [In Russian pp. 445-452.]

The following (in the French translation) are the authors' conclusions regarding the breeding-grounds of *Anopheles maculipennis*. Acid water with a considerable oxygen tension is not avoided by the parturient female, but the larvae do not live in it. Discoloured *Sphagnum* water poor in oxygen is also inhospitable to the larvae and is avoided by the parturient female. But water having a high calcium content, even if it be deficient in aliment, is very attractive to the parturient female and propitious to the larvae.

A. A.

YOAKNOVITCH (G.) Contribution à la biologie de l'*Anopheles superpictus* dans la Serbie du Sud. [Contribution to Biology of *A. superpictus* in S. Serbia.]—*Bull. Office Internat. d'Hyg. Publique*. 1928. July. Vol. 20. No. 7. p. 1060.

In Southern Serbia SMITCH has observed that *Anopheles superpictus* breeds only in streams. Consequently such larvae as are hatched early in the year are swept to destruction by the torrential floods of the spring season, so that the species flourishes only after the onset of the dry season, in July.

A. A.

DAVIS, N. C. A Consideration of Variability in the *Eusynochus* Group of the Genus *Anopheles*.—*Amer. Jl. Hyg.* 1928. July. Vol. 8. No. 4. pp. 539-563. With 3 figs. & 5 graphs. [7 refs.]

This paper contains much tabulated statistical detail illustrating variability of the costal markings of *Anopheles albitermis*, *A. argyrotarsis*, *A. tarsimaculatus* and *A. rondoni* and variability in the amount of black marking of the 2nd segment of the hind tarsus of those species and *A. backusae*. Adults of some of these species have been reared from eggs laid by captured gravid females, and even among the offspring of a single mother the costal formula and the black on the said tarsal segment may differ from the maternal standard. The author inclines to drop *A. rooti* Brèthes and *A. erassi* Brèthes, and perhaps also *A. stroderi* (apud Root) as specific designations.

A. A.

- DAVIS (Nelson C.) & SHANNON (Raymond C.) The Blood Feeding Habits of *Anopheles pseudopunctipennis* in Northern Argentina.—*Amer J Trop Med* 1928. Sept Vol. 8. No. 5 pp 443-447 [4 refs.]

In this study of the stomach-contents of *Anopheles pseudopunctipennis* 652 stomachs were selected from 1 600 specimens collected nearly all in April, and practically all in houses of the poorer class of workmen in two localities in the province of Tucuman Argentina. By the precipitin reaction the specific determinations of the blood present in the stomach material were as follows, in percentages
Man 50.0 dog 21.8 horse 8.9 sheep or goat 6.2 cow 5.5
chicken 3.2 hog 2.5 cat 1.8.

A. A.

- MAYNE (Bruce) An Anopheline Mosquitoes [sic] as Host for the Parasites of Bird Malaria.—*Indian J Med Res* 1928. Oct Vol. 16 No. 2. pp 557-558.

In the course of experiments (here described and tabulated in detail) with a malaria parasite of birds provisionally identified with *Plasmodium praecox* of Grassi and Feletti the author has found that *Anopheles subpictus* (=rossi) can harbour that parasite. Two out of forty-eight wild specimens (i.e. specimens captured in a room where several infected birds were kept) and five out of ninety-six laboratory bred and fed specimens, were found infected.

A. A.

- ESSED (W. F. R.) *Myzorchynchus sinensis* var. *separatus* Loic of *Myzorchynchus hunteri* Strickland? [*M. sinensis* var. *separatus* Loic. or *M. hunteri* Strickland?].—*Meded Dienst d Volksgezondheid in Nederl Indië* 1928 Vol. 17 No. 2. Dutch Edition pp 306-310 [Foreign Edition pp 220-224] With 13 figs on 4 plates [3 refs.]

Description of an *Anopheles* of the *Myzorchynchus*-group occurring in the Dutch East Indies (Rhio and Natuna Archipelago) which comes nearest to or is even identical with *Myzorchynchus hunteri* Strickland.

N. H. Swellengrebel.

- BRUG (S. L.) *Anopheles* (*Neomyzomyia*) *longirostris* n. sp., (Diptera, Culicidae).—*Meded Dienst d Volksgezondheid in Nederl Indië* 1928. Vol. 17 Pt. 2. pp 424-425 Also in *Geneesk Tijdschr v Nederl Indië* 1928 Vol. 68 No. 2 pp 278-279 With 4 figs on 3 plates [Med. Lab. Weltevreden.]

This [very questionable] new species is stated to be like *Anopheles tessellatus* except for having the palpi shorter than the proboscis. It is based on a single specimen [which in respect of its legs complies with the wearisome formula of a single mutilated female.]

A. A.

- CHOWDHURI (K. L.) The Larva of *A. jeyiporensis* James.—*Indian J Med Res* 1928 July Vol. 16 No. 1 pp 39-40 With 3 figs on 1 plate [3 refs.]

Corrected diagnosis and table showing distinctive features in comparison with the larvae of *Anopheles aconitus* and *philippinensis*

A. A.

- BACCHELLI (G) & TADDIA (L.) Ricerche nel sangue e negli organi interni della *Gambusia affinis*.—*Arch Ital Sci Med Colon* 1928 Vol. 9 No. 8 13 pp. With 3 figs. [11 refs.] [Inst. of Trop Path., Univ. Bologna.]
- BARRAUD (P. J.) A Revision of the Cubicine Mosquitoes of India. Part XXIV The Indian Species of the Subgenera *Stinsson* and *Aedes* with Descriptions of Eight New Species, and Remarks on a New Method for Identifying the Females of the Subgenus *Aedes*.—*Indian J. Med. Res* 1928. Oct. Vol. 16. No. 2 pp. 357-375 With 42 figs. on 8 plates.
- BIDEGARAY (Henri) Etude statistique et critique du parasitisme intestinal. La technique en coprologie. (Travail du Laboratoire de Parasitologie de la Faculté de Médecine).—60 pp. With 1 plate. [104 refs.] 1927 Paris. Librairie M. Lac, Editeur 26 rue Monsieur-le Prince (Vie Arr.)
- BRUNK (G.) Sulla tricoemoniasi intestinale. — *Arch Ital Sci Med Colon*. 1927 July Vol. 8. No. 7 pp. 373-387 [8 refs.]
- BURTON (Patrick A.) An Aspirator for Catching Midges.—*Trans. Roy Soc. Trop Med & Hyg* 1928 Aug. 22. Vol. 22 No. 2. pp. 179-180. With 1 text fig. [London School of Hyg. & Trop. Med., London.]
- CASPER (AL R.) & GREENWAY (D.) Indices protozoários intestinais humano — *Arch. Argentinas enferm. Aparato Digest y Nutric.* Buenos Aires. 1928. Vol. 4. No. 1 pp. 43-48. With 6 figs. (1 coloured plate). [5 refs.]
- CHOWDHURY (K. L.) A Note on the Larva of *Anopheles philippinensis* Ludlow 1901 and its Diagnosis.—*Indian J. Med. Res* 1928. July Vol. 16. No. 1 pp. 41-44 With 3 figs. on 1 pl. [3 refs.]
- DA CUNHA (A. Mary es) & MURTA (Juho) La réaction nucléaire de Feulgen chez les protozoaires kistocytocles et appareils parabasal.—*C. R. Soc. Biol.* 1928 Nov. 2. Vol. 99 No. 30 pp. 1330-1341 [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]
- VON ICKING (R.) Os guardas ou barrigodinhos "brasileiros" na luta contra as larvas de cobiceiros.—*Sciencia Med.* 1928. Aug. Vol. 6. No. 8 pp. 398-401 With 4 figs. (3 on plate)
- JORDAN (David Starr) The Mosquito Fish (*Gambusia*) and its Relation to Malaria.—*Smithsonian Rep for 1926*, pp. 361-368 With 6 figs. on 4 plates
- LIMA (A. da Costa) [In Portuguese & English.] Notas sobre a biologia do *Tetrastemus ferrii* Lima, parasito dos ovos de *Tristramia*. Notes on the Biology of *Tetrastemus ferrii* Lima, an Egg Parasite of *Tristramia*.—*Mém. Inst. Oswaldo Cruz* 1928 Vol. 21 No. 1 In Portuguese pp. 201-208 With 3 plates. [3 refs.] In English pp. 210-218. With 3 plates. [5 refs.]
- LIMA (A. da Costa) Sobre algumas anophelinas encontradas no Brasil.—*Sciencia Med* 1928 May, July & Aug. Vol. 6 Nos. 5, 7 & 8. pp. 248-251 334-341 406-411 With 7 text figs. & 13 figs. on 6 plates. [Oswaldo Cruz Inst. Rio de Janeiro Brazil.] also in *Mém. Inst. Oswaldo Cruz*. 1928 Nov. Supplement No. 2. pp. 91-113 With 25 figs. (17 on 9 plates) [49 refs.]
- LOCATO (Giuseppe) L'uso del latte acido indigeno quale causa di miasa intestinale a Gadenico.—*Arch Ital Sci Med Colon* 1927 July Vol. 8. No. 7 pp. 363-393 [Inst. of Trop Path. Univ. Bologna.]
- PHILLIP (Cornelius B.) Methods of collecting and rearing the immature stages of *T. basidus* (Diptera).—*J. Parasit* 1928 June. Vol. 14 No. 4. pp. 243-253 With 1 text fig. [13 refs.] [Minnesota Agric. Experiment Station, Minnesota.]
- PURI (I. M.) On Two Species of Indian Anopheline Mosquitoes, *A. jayakerensis* James and *A. moghulensis* Christophers.—*Indian J. Med. Res.* 1928 Oct. Vol. 16 No. 2 pp. 613-618. With 12 figs. on 2 plates. [6 refs.] [Central Research Inst. Kanpur, India.]
- VON KROKHIN (P. W.) Détermination des kystes de protozoaires intestinaux à l'aide du procédé d'enrichissement.—*Russian J. Trop. Med.* 1928 Vol. 6. No. 3 pp. 283-286. (5 refs.) [In Russian.]
- YOUNG (T. C. McComb) & MAJID (Sayid Abdul) A Variety of *Anopheles karneri* collected in Coorg, S. India.—*Indian J. Med. Res* 1928. Oct. Vol. 16 No. 2 pp. 469-471 With 5 figs. on 1 plate. [4 refs.]
- ZAIKINE (A. A.) Etudes sur la biologie de *Anopheles* à Fenne.—*Russian J. Trop. Med* 1928. Vol. 6. No. 3 pp. 290-292. (1 ref.) [In Russian.]

TROPICAL DISEASES BULLETIN

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MEDICAL ZOOLOGY

JOHNSON (W B) & LLOYD (Llewellyn) *Report of the Tsetse Investigation, 1927—Ann Med & San Rep Nigeria 1927* Appendix B pp 47-58 With 8 figs (6 on 3 plates) & 1 chart [2 refs]

An account of field experiments in the control of *morsitans* and *tachnoides* was published during the year (and has been noticed in this Bulletin Vol 24 p 891) In continuation of them the experiment of eradicating thickets of primary and secondary foci of the fly while leaving the forest in general untouched has been studied, and has been found successful with *tachnoides* which is dependent on these foci throughout the year though not so far with the freer ranging *morsitans* The numbers of the latter species are reduced during the dry season when the species is dependent on the foci but recover again during the wet season but it yet remains to be seen whether a concentrated (and more costly) attack on the primary foci will foil the wet season spread and increase Some clearing along streams for discomfiture of *palpalis* has also been done The practice of late burning of jungle has not been successful since the cut stuff does not become dry enough for a thorough burn out before the onset of the rains The matter requires further study to decide between the comparative advantages of early clearing and burning or postponement of the late burning to the following dry season In any case it will often be found necessary to go over ground again and repeat cutting and burning An axe helved like a pick has been found far superior to the ordinary woodman's axe and machete, for clearing The authors have confirmed for *Glossina* the discovery (made by CORNWALL and PATTON in working on certain Indian bloodsucking flies) of the presence of a coagulin in the salivary glands and an anticoagulin in the gut and they devote a considerable part of their report to a technical account of these enzymes—and another considerable part to the use of the precipitin test for determining the source of the blood found in stomach of the fly

The number of cases of sleeping sickness treated during the year is 364 with an undetermined mortality since although 6 fatal cases have been found out only a small proportion of patients are heard of again Cases in the later stages of the disease get a course of trypanamide—1 gm. intravena on 1st day 2 gm. on 4th day followed by 2 gm. at weekly intervals to a sum total of 13 gm. The results in general are good, with a very obvious improvement after the first dose A few cases having a very short history where trypanosomes could be demonstrated in the blood, were given a course of Bayer 205—

a weekly injection of 1 gm. intravenously for 5 weeks. A note is added of four natives on the staff who became infected some years ago and received the Bayer course soon after the onset of the disease, of whom one has remained perfectly well for nearly 5 years and the other three for 4 years.

A. A.

LAMBORN (W. A.). Medical Entomologist's Report for 1927 Tsetse Control Scheme.—Nyasaland Protectorate Ann Med Rep for Year ending 31st December 1927 Appendix III p 29

This report tells a story of tsetse control near Fort Manning, which during the absence of the medical entomologist was in the hands of a small committee. Early in the year 1927 and as the rainy season advanced, fly broke southwards across the experimental belt of clearing in several places. The sub-committee thought that these invasions could be explained by the facts that the belt had hardly reached the maximum width fixed, and that only a small section of the proposed line of settlement had been completed. The sub-committee therefore recommended the continuation of the scheme in its original shape—the maintenance of the clearings, and the occupation of the villages on the line of settlement. At the end of the year an entire absence of fly south of the belt was reported.

Early in 1928 the medical entomologist returned and found only a few flies south of the line and observed also that the retreat of fly north of the line had been maintained, except in two places. He was satisfied with the result and wrote hopefully of proceeding with the scheme of clearing and settlement. The Director of Medical and Sanitary Services, however adds the following postscript. Since the completion of this report the fly has again crossed or come round the line, this time in such quantities that probably the scheme will have to be abandoned.

A. A.

JACK (R. W.). Some Environmental Factors relating to the Distribution of *Glossina morsitans* Westw. in Southern Rhodesia.—South African JI of Sci 1927 Dec Vol 24 pp 457-475 With 1 map in text

This is an attempt to dissociate for practical recognition certain large obvious constituents of the natural environment of *Glossina morsitans* in Southern Rhodesia. The author's analysis includes merely configuration of the land, mean annual temperature and rainfall, geological formation, and general features of forest. His most general conclusion is that all areas in Southern Rhodesia that do not lie above 4 000 feet (or 5 000 feet in the lower latitudes) have an annual mean temperature not below 68° F (or 70° F) are forested (but not too densely) and are inhabited by game are suitable for *Glossina morsitans*. He notices that Kalahari Sand (irrespective of its elevation) and Gusu forest (characteristic of the Kalahari formation) are generally shunned by the fly but thinks that this avoidance may be due to deficiency of game rather than to any direct effect of soil or forest. His further observation that completely open country is not occupied by the fly unless it happens to be a haunt of game also illustrates the determinative influence of food supply.

A. A.

the author estimates the tsetse-fly infested area in Zululand to extend continuously through about one-third of the entire length of the country as represented in the map that accompanies his paper *

A. A.

DUKE (H. Lyndhurst) HALL (G. Norman) & HADDON (E. C.) An Examination of the Efficacy of Arsenical Solutions in the Reclamation of Tsetse Areas.—*Bull Entom Res* 1928. Aug. Vol. 18 Pt. 1 pp. 7-29 11 refs

The work reported in this paper was suggested by a newspaper correspondence in South Africa advocating an intensified arsenical dipping of cattle as a means of ridding *Glossina*-infested tracts of fly. The idea seemed to have something in it—it appeared to explain, to popular satisfaction, the experience that fly had vanished from certain tracts subsequent to the importation of cattle that were regularly dipped—moreover HADDON had shown that *Glossina pallidipes* settling on blotting-paper soaked in sodium arsenite absorbed the poison and quickly died. Thus there was a plausible case for the well-planned scientific investigation here fully recorded. The experiments show that a fly can take up poisonous doses of arsenic from either a wet or a dry impermeable surface which the insect has persistently to palpate and explore with its proboscis in vain attempts to effect penetration but that when the vehicle for the poison is the inviting skin of a living animal, which can be penetrated quickly and without suspicious preliminary exploration, the risk of absorbing the poison is enormously reduced—this is the case even when the skin is actually wet with the arsenical solution, but when the fluid has dried on the skin the risk to the fly seems to be negligible.

Out of a full and varied tale of experiments the two following illustrate clearly enough the authors line of argument—

(1) Laboratory-bred flies were fed on alternate days for a term of 15 days on a bull that had been dipped regularly for many months—sixty five per cent. of the flies were alive on the 15th day. As a control flies were fed on alternate days on a goat quite innocent of arsenic—forty three per cent. of them were alive on the 15th day. (In considering the death-rate it is explained that during the first few days of their captivity in the experimental boxes almost always some flies die without having fed.) (2) A batch of 16 flies was set on a plot of skin of a live goat, the plot having just been well soured with a 5.5 per cent. solution of sodium arsenite—at the end of 24 hours 10 flies were dead and 6 were alive—but of the 10 dead the stomachs of six contained only a few blood cells of the goat (signifying difficulty in feeding), three were empty and one contained human blood (indicating a feed prior to experiment)—the 6 survivors of the experiment all had a stomach full of goat blood. A batch of 20 flies was set on a similarly poisoned plot of the skin of a goat after it had dried—at the end of 24 hours 19 flies were alive and only 1 was dead.

There are however still two aspects of the question that might, perhaps, be further investigated. (1) HADDON has demonstrated the attractiveness for tsetse-flies of conspicuous dummy animals. The surface of a dummy would be dry and impermeable and would, if impregnated with poison, be dangerous ground for inquisitive tsetse flies—should experimentation on this line be considered promising

It was at Uvombo Zululand, that B. VICK discovered the arthropodology of asana.

from the practical standpoint (2) It appears to be established, both by experiment and by observation in the field—be the explanation what it may,—that animals are fortified against the effects of trypanosome infection or at least are much improved in health in a fly infested territory by arsenical dipping

A A

LESTER (H M O) & LLOYD (LI) Notes on the Process of Digestion in Tsetse-Flies.—*Bull Entom Res* 1928 Aug Vol. 19 Pt 1 pp 39-60 With 10 text figs. [7 refs.]

To begin with the authors draw attention to some interesting details of the alimentary tract of the tsetse fly and in describing the method of feeding and the capacity of the crop and stomach they state that the weight of blood imbibed by the fly (average of five observations in each case) was for *Glossina tachinoides* male 220 per cent and female 140 per cent. of the body weight and for *G. morsitans* male 140 per cent and female 160 per cent of the body weight. Of their work on the enzymes and processes of digestion the following is the authors own summary —

(1) The salivary glands of *Glossina* contain a powerful anticoagulin which delays the clotting of blood of mammals birds reptiles and batrachians. It was found that when the salivary glands are removed from the living fly it can still draw blood normally and may live long but sooner or later large clots form in the narrow anterior portions of the alimentary tract, so that the fly can no longer feed and dies of starvation. The purpose of the anticoagulin is to prevent such clotting and blood coagulation in the crop

(2) The proventriculus and first third of the mesenteron are themselves inert in relation to coagulation of blood, but as removed from the normal fly they contain the anticoagulin which is derived from the salivary secretion

(3) The hinder part of the mesenteron contains a powerful coagulin the purpose of which is to neutralise the anticoagulin and cause a rapid clotting in order to retain the fluid meal in the proper region while draining and assimilation take place probably also to save strain on the sphincter mesenterici and prevent the occasional loss of food through the anus

(4) Both enzymes have all the ordinary properties of ferments the salivary enzyme being rather the more stable of the two. When mixed they probably unite by some weak chemical action and form an inactive compound. It also appears probable that the salivary enzyme combines loosely with some element in the blood in such a way that its neutralisation by the coagulant enzyme is delayed. The salivary enzyme is believed to intervene in what is considered to be the first phase of clotting the formation of thrombus and to be akin to antikinase. As the mesenteric enzyme has no effect on blood from which the calcium has been removed it is not akin to thrombin and probably also influences the first phase of clotting, acting like the enzyme kinase

(5) Very rapid draining of the meal is necessary to lighten the fly and allow the blood to pass from the crop to the midgut while the salivary secretion still prevents its clotting. The mechanism of draining is described. The Malpighian tubes only function properly when the fluid of the meal has an osmotic pressure near that of blood. A large meal of water kills the fly generally rapidly

(6) The names pro-meso- and meta-rectum are proposed for the regions of the hindgut

A A.

HICKS (E. P.). The Relation of Rat-Flea to Plague in Shanghai.—*Jl of Hyg* 1927 July 15 Vol. 26. No. 2 pp. 163-169
[With 1 chart in text. 11 refs.]

Though Shanghai is in close communication with ports where plague is endemic it has not suffered badly from plague also the number of human cases is small in comparison with the number of infected rats found. Both *Xenopsylla cheopis* and *Ceratophyllus fasciatus* are present in considerable numbers the former flourishing in summer and the latter in winter and spring. The author gives some reasons for concluding that *X. cheopis* is the chief local agent in spreading plague and for thinking that plague is unlikely to reach Shanghai in the *cheopis* season. On the other hand he is inclined to regard *C. fasciatus*, the winter flea, as less likely to spread infection. The only other local rat flea—and far the most abundant species of all—is *Ctenopsylla muscaldi* which is said to be extremely reluctant to bite man. The author does not claim that these conclusions are much more than suggestions.

A. A.

CARRIÓN (Arturo L.). Preliminary Report on a Rat-Flea Survey of the City of San Juan, Porto Rico. Second Paper.—*Porto Rico Rev of Public Health & Trop Med* 1928. Aug Vol. 4 No. 2 pp. 84-92. With 7 charts in text.

In a year up to June 1928 the live rats captured at San Juan, Porto Rico, numbered 306 of which 74.49 per cent. were *Mus decumanus* and more than half the rest were the variety *alexandrinus*. Fleas were found on a few more than half of them—2,600 fleas in all, of which 99.5 per cent. were *Xenopsylla cheopis*, all but 3 of the remaining fraction being *Echinophaga*. The flea index as usual followed the humidity curve being highest (11.8) in December and lowest (2.6) in September. The record number of fleas on a single rat was 303 caught on an *alexandrinus*.

A. A.

PEARSE (A. S.). Fleas found on Rodents and Insectivores in Nigeria.—*Bull Entom Res.* 1928 Oct. Vol. 19 Part 2 pp. 167-169.

The rodents and insectivores from which the 8 species of fleas named in this list were collected are all residents of the jungle and desert. The list comprises 3 species of *Xenopsylla* including *cheopis*, 2 species of *Ctenocephalus* including *canis*, *Echinophaga gallinacea*, a *Ceratophyllus* and a *Synosternus*.

A. A.

PAWLOWSKY (E. V.) & STEIN (A. L.). Ueber die giftigen Eigenschaften des Käfers *Paederus fuscipes* (Fam. Staphylinidae) auf die Menschenhaut. [Toxic Properties of the Beetle, *P. fuscipes*, on the Human Skin].—*Ztschr f Parasitenkunde* Berlin. 1928. Oct 27 Vol. 1 No. 3. pp. 476-483. [4 refs.] [Zool. Inst.-Milit. Med. Acad. & Skin Clinic, State Inst. for Med. Science, Leningrad.]

[The small Staphylinid beetles of the wide-ranging genus *Paederus* are notorious for their blistering property when handled.] The authors

find that this property is active equally in spring and autumn so that the seasonal frequency of *Paederus dermatitis* in certain places is not to be explained by any periodic changes in the quality of the beetle. The vesicating element is not destroyed by heating to boiling point for half-an-hour and it can be completely extracted by alcohol, chloroform and ether

A A

GLADIN (Sophie) Experimentelle Untersuchung ueber die Wirkung des Käfers *Paederus fuscipes* Curt (Fam Staphylinidae) auf das Kaninchenauge. [Action of *P. fuscipes* on the Rabbit's Eye].—*Arch f Ophthalm* 1928. Vol 120 No 1/2 pp 229-234 With 1 coloured fig [3 refs] [Zool Inst Mil't Med Acad Leningrad]

It has been supposed that the dermatitis caused by the urticating beetles of the Staphylinid genus *Paederus*—in this particular instance *P. fuscipes*—is due to the vesicant properties of the insect's blood and reproductive secretions and that these come into play when the little insect is crushed on the skin and the sharp fragments of its hard and brittle cuticle scrape the epidermis. In a series of experiments on guinea-pigs the present author shows among other things that an extract of the beetle's cuticle freed from any fragments of chitin can set up when introduced into the conjunctival sac a conjunctivitis of some days' duration which also involves appreciably the cornea and the iris.

A A

IVENGAR (M O T) Infestation of the Human Intestine by Coprid Beetles in Bengal.—*Indian Med Gaz* 1928. July Vol 63 No. 7 pp 365-369 With 4 figs on 1 plate [11 refs.]

The author reports some more authentic instances of infestation of the bowel of children in Bengal by Scarabaeid dung beetles of the genera *Onthophagus* and *Caccobius*. He inclines to the opinion (see also this *Bulletin* Vol 21 p 789) that the beetles enter per anum, since it is known that the closely related Australian beetle *Macropocopsis* which normally infests the dung of the wallaby has also been found in the cloaca and intestine of that animal.

A A

VENERONI (C.) Le paralisi da zecche in Somalia [Tick-Paralysis in Somalia].—*Arch Ital Sci Med Colon* 1928. July Vol 9 No 7 pp 405-406 [Principessa Maria Colonial Hosp Chisumao Italian Somaliland.]

Two cases are described. One a child of 4 years with loss of voluntary movement of the legs and abolition of the reflexes the second a child of six years with a *Rhipicephalus simus* on its neck. This child presented tonic and clonic convulsions of the muscles of the neck and face, with rapid breathing and tachycardia a condition which did not clear up for two weeks.

H. Harold Scott.

FRANCHINI (Giuseppe) Ixodidi delle colonie italiane dell'Africa del nord e dell'Africa orientale. [Ixodidae of the Italian Colonies in Africa.]—*Arch Ital Sci Med Colon* 1927 Oct. Vol. 8. No. 10 pp. 555-558. [Inst. of Trop Path., Univ., Bologna.]

This list of the ticks includes two new species, *Ixodes festus* and *Rhipicephalus pulchellus humeralis*, which has been confused with *R. ectractus* (Neum.)

H. Harold Scott.

PARROT (L.) Un ornithodore nouveau du Sahara Algérien *Ornithodoros foleys* n. sp. [A New *Ornithodoros* of the Algerian Sahara.]—*Bull Soc Path Exot* 1928 July 11 Vol. 21 No. 7 pp. 520-524 With 5 text figs. [Pasteur Inst. Algiers.]

The species here described and figured in minute detail was found in the sand in the Algerian Sahara. It is said to attack man and the dromedary and to cause in man a lesion resembling a boil or a chancre. It is described as having a general resemblance to *O. tholozani* and *O. canestrinii*—differing in the surface sculpture of the body in the form of the tarsi and of the first pair of coxae and in the form and dentition of the hypostome.

A. A.

RÜGE (Heinrich) Kurze Beschreibung des *Ornithodoros venezuelensis* (Brumpt 1921). [Short Description of *Ornithodoros venezuelensis*.]—*Arch. f. Schiffs u. Trop Hyg* 1928 Aug. Vol. 32 No. 8 pp. 408-409 With 8 text figs. 1 ref. Inst. for Ship & Trop. Diseases, Hamburg.]

The description is as follows:—

Colour sandy yellowish brown. Eyes not visible. Body with sides parallel, anteriorly pointed, posterior border semicircular, i.e., pentagonal with hind border convex. Back thickly beset with small polygonal granules and with numerous short hairs. Caputulum sunk in a cutaneous flange having turned edges and movable side flaps reaching—as also do the chelicerae—to the end of the third segment of the stoutish pedipalp. Hypostome shorter than the chelicerae, longitudinally grooved and having only a single row of teeth on each side. Coxae of one size and in contact. Only the tarsus of the 1st pair of legs has a prominent tubercle on the anterior border.

A. A.

PAWLOWSKI (E. V.) L'étude des tiques *Ornithodoros*, comme le problème de tout des études régionales dans la moyenne Asie. [*Ornithodoros* Studies in Central Asia.—*Pease Mid d Uzbekistan*. Tashkent, 1928 June-July No. 6-10 French summary p. 98. [In Russian pp. 5-11. With 3 figs. 11 refs.]

Ticks of the genus *Ornithodoros* now being known to transmit typhus fever in Central Asia, the author appeals for collections of ticks from that region to be sent to him for study at the Zoological Museum of the Academy of Sciences at Leningrad.

A. A.

WARBURTON (Cecil) The Harvest Bug An Account of the Present State of our Knowledge of the Larval Trombidid Mites attacking Man.—*Parasitology* 1928. July Vol. 20 No 2. pp 228-236 With 2 text figs. [20 refs.] [Moltano Inst for Research in Parasit Cambridge.]

This useful paper clarifies our knowledge of the minute hexapod mites, known popularly (save the mark) as harvest-bugs harvest mites bête rouge, rouget, chigger mites and scientifically as Trombidid larvae which in many parts of the world are a torture to mankind at certain seasons. The author gives the following list of the species known to attack man individually they have been described under many different names but the generic name *Trombicula* alone possesses any validity *Acarus batatas* L the batatas of Surinam *Leptus autumnalis* Shaw the European harvest mite *Trombidium americanum* Riley and *T irritans* Riley North American harvest mites *Trombidium tlazahuatl* Brumpt the tlazahuatl or tlazahuatl of Mexico *Trombicula akamushi* Brumpt the kedani or river fever mite of Japan *Microtrombidium wichmanni* Oudemans *U vandersanderi* Oudemans, *Trombicula deliensis* Walch and *T shueffneri* Walch, all from the Dutch East Indies and *Lecanenchovia australiensis* Hirst the Australian harvest mite Besides these there are two other European species the exact designations of which still seem to be uncertain

Acarus batatas was named by LINNAEUS in 1758 and *Leptus autumnalis* was recognized as being merely a larva (and not as previously supposed, adult) in 1834 but it was not until 1916 when MINAJIMA and OKUMARA followed the development of the kedani or Japanese river fever mite that the main facts in the life history of a Trombidid larva became coherent knowledge The larva in question attacks several small mammals and particularly fieldmice adhering to the ears. It remains on its host 3 or 4 days and then drops to earth. In a week, or rather more nymphs emerge which are not predaceous and can be reared (in a moist atmosphere) on mild (not acid) juicy vegetables.

After growing somewhat the nymphs take to earth, and a few days later assume a form almost like the adult but probably requiring another moult When the adult form had thus become recognizable, the adults were discovered in nature among decaying leaves and in grass and in the silt left by floods, feeding—as did the nymphs—on a kind of reed and on a species of *Artemisia*. Subsequent to the Japanese determination of the genetic status of the kedani mite one of the North American harvest mites *Leptus irritans* was reared and also proved to be the larva of a *Trombicula*.

Regarding the European harvest mite *Leptus autumnalis* BRANDIS in 1897 observed that it took to earth and that about a month or 6 weeks afterwards a nymph emerged and BRYANT in 1910 also obtained from a large number of larvae a single nymph which was with some hesitation attributed to the genus *Microtrombidium* but the adult form has not yet been certainly identified, although HIRST in 1925 reared a single nymphal female which is only one moult short of the adult phase.

All the harvest mites whose development has been followed hitherto have thus been proved to be of the *Trombicula* type. The life-history of the batatas of Surinam and of the tlazahuatl of Mexico appear to be still unknown but all the harvest mites from the Dutch East Indies are considered to belong to the genus *Trombicula*. A A

GROMASCHEWIKIJ (L. W.) & SCHUCHAT (J. A.) Milben in den Faeces des Menschen. [Mites in Human Faeces. — *Russian Jl Trop Med* 1928. Vol. 8. No. 4. German summary pp. 278-279. [In Russian pp. 209-216. With 4 figs. 14 refs.]

The authors, in Odessa, examining the stools of a lot of 46 school children for evidence of worms found mites and mite-eggs in 50 per cent. of them (44 per cent. boys and 57 per cent. girls). The mites were chiefly food mites of the species *Tyroglyphus farinæ*. [It is not made clear in the translation that the mites were alive.]

A. A.

VRZETICH (H. Graf). Zoologische Acarustudien. [Zoological Studies on Acari. — *Ztschr f Parasitenkunde* Berlin. 1928. Apr 17. Vol. 1. No. 1. pp. 1-23. 18 refs.]

This is an academic dissertation on the species or varieties, of itch-mites, based on a zoological transmutation of a botanical text that "a fundamental obstacle to finality in the taxonomy of the Schizomycetes [lege Itchmities, is the fact that the study of them has been so multi-laterally prosecuted by non-botanists lege non zoologists]."

A. A.

STEPHENS (J. R. C.) GLOVER (William E.) *Porocephalus Armillatus*. [Correspondence. — *West African Med Jl* Lagos. 1928. July. Vol. 2. No. 1. p. 107.

Stephens, from Ikom (Nigeria) refers to a case reported by him where *Porocephalus armillatus* [presumably encysted, since the specimens were numerous] was found during an operation upon a healthy African for hernia. He elicited the fact that the man was accustomed to eat snake-flesh smoked but not properly cooked.

Glover mentions his finding at an autopsy on an African at Enugu, of 30 or 40 encysted specimens of *P. armatus* embedded in the liver and intestines.

A. A.

MANUWA (S. L. A.) Notes on a Case of *Porocephalosis*. — *West African Med Jl* Lagos. 1928. July. Vol. 2. No. 1. pp. 109-110.

Manuwa describes at some length the discovery post mortem, of numerous larvae of *Porocephalus armillatus* in the liver and the spleen of a male Ibo of 28 years who died in the Calabar hospital, two hours after admission in a state of wild delirium. The condition of the lungs post mortem, indicated tuberculous broncho-pneumonia as the cause of death. "*Porocephalosis* cannot with certainty be said to [have been] a contributory cause."

A. A.

BULLETIN OF THE ANTIVENIX INSTITUTE OF AMERICA. Philadelphia. Pa. 1928. June. Vol. 2. No. 2. pp. 25-53. With 6 text figs.

Besides some short notes there are 11 articles in this number. Three of them, on snakes of Central America, cover the same ground as the

papers from the United Fruit Company's 1927 Report already noticed. Three others are interesting and amusing but hardly come within the scope of the *Tropical Diseases Bulletin*. From what remains the following items are abstracted.

In *New Facts about Snakes* F. W. FITZSIMONS states that he has frequently observed persons to suffer from a sort of chronic poisoning after receiving a sub-lethal dose of venom in a bite from cobra and (more often) from puff-adder. The symptoms are those of partial paralysis of the bitten limb and periodic sloughing near the site of the bite. An Unusual Snake-bite Accident by S. W. CARTWRIGHT tells of an attendant who in the process of administering first aid in a case of snake-bite got some of the blood that exuded from the bite into an abrasion of his own finger. About 2 hours afterwards nausea and vomiting occurred and persisted, and the finger swelled considerably. The patient himself (who in due course was treated with antivenin) had no symptoms.

F. EIGENBERGER describes in detail the effects upon himself of intradermal injection of a moderate dose (0.2 cc. of a dilution of one drop of venom in 10 drops of normal saline) of the venom of *Dendraspis viridis* [an African Elapine snake]. An immediate burning sensation was followed in 5 to 10 minutes by localized itching and swelling, then by distressing excitability of all cranial nerves and such misery as drove him to excise the swelling, apply a tourniquet and use KMnO_4 , then by numbness beginning in face and throat and extending to fingers and toes with motor paresis, dysphasia, dysphagia and dyspnoea. The culmination of all these symptoms occurred at about 1½ hours after the injection. At about 2 hours all the numb regions became painful till at 5 or 6 hours the whole body—but particularly in the distribution of the cranial nerves—was painful wherever touched. The sensorium was not affected. The author was well enough to do his work next day. He thinks *Dendraspis* venom is not essentially different from cobra venom—perhaps more neurotoxic and more pronounced in its effect upon the cranial nerve-centres. D. D. H. MARCH reports an interesting medico-legal case from Quingua hospital. Two men had quarrelled, and one had threatened to take the other's life. Subsequently both men had started for home by the same road, the more vindictive man some time after the other. The threatened man, however, never got home and a search party found his dead body a few feet off the road, with blood on the lips. Fortunately the post mortem examination was in competent hands: no signs of violence were found on the body but on one leg which was oedematous, two close-set punctures were discovered; furthermore there was abundant evidence of general haemolysis. It was evident that the man had been bitten by a snake and probably by a fer-de-lance.

We may refer finally to the Costa Rican law for protection of the people against snake-bite, a translation of which is here published. Its provisions prohibit the sale of quack remedies, ordain the machinery both for the education and for the treatment of the public against snakes and snake-bite and impose upon employers of labour the obligation of keeping all the material necessary for serum treatment, in places where it is likely to be required. If a labourer die from snake bite in any industry where the local supply of such material is not maintained the responsible employer shall pay to the victim's relatives a sum equal to the victim's last year's salary.

and further information was acquired in neighbouring countries where the United Fruit Company has plantations and now the venomous snakes with which the Company has to deal are known to be of 8 species, namely *Lachesis atrox*, *L. schlegelii* (the horned palm viper "*locarand tolocha-de festinas orofel*") which is not very dangerous, *L. brachyotoma* (the "hog-nosed viper" *lanaga*) probably dangerous, *L. mutus* (the bushmaster") notoriously dangerous, *Crotalus terrificus* (*cascabela*) also very dangerous and *Elaps nigrocinereus* (a coral snake, *gargantilla*) of burrowing habit very venomous, but not given to biting. The extent and the specific characters of the danger having been denuded, the Company has started a laboratory and snakeery at Tela in Honduras, where live snakes are kept and studied and milked of their venom, which is collected, dried, and despatched to the Antivenom Institute of America, for employment in the making of antisera. A similar establishment at Santa Marta in Colombia is in prospect.

A. A.

PAMPANA (Emilio J.) I serpenti velenosi della Colombia. [Venomous Snakes of Colombia. — *Arch Ital Sci Med Colon.* 1928, Vol. 9, No. 4 pp 3-13 7 refs]

The author gives an interesting sketch of the poisonous snakes which he has met with during six years of practice in Colombia. The commonest is *Lachesis leptura* which lives mainly in the forest, so that cases of human victims are rare. Death in one instance occurred in 30 hours. *L. brachyotoma*—the hog-nosed viper—is next—if not fatal its bite is followed by extreme necrosis. Third in frequency is *L. mutus*, the bushmaster" which lives chiefly on rats and consequently is found in or near houses as in the wood pile. One case is recorded of death in 10 minutes but it is probable that the poison was injected directly into a blood-vessel. Next come *L. atrox* and *L. lanceolatus*, which some regard as synonymous. These are most dreaded and are responsible for the majority of human cases of snake-bite. *L. schlegelii* is a small snake of some 50 cm. in length, often conveyed with fruit but found also in houses. The author's specimen was given him by a lady who found it in her slipper when she got out of bed one morning. It is apparently not very aggressive—this one did not attack and an instance is mentioned where a child amused itself with one for several mornings before the parents discovered what was going on. This had been brought in with some bananas. Lastly *L. jaracouza*, which BOUTLERGER regards as a variety of *L. lanceolatus*.

The species of *Elaps* mentioned are *E. marginatus*, *E. fraseri*, *E. corallinus*, *E. lemniscatus* and *E. spardicus*.

These poisonous snakes have as notorious natural enemies *Oxyrhops clausa* and *Erythrolamprus aesculapii* which, it is stated, live solely on snakes.

Specific treatment is applied when possible with sera from the Institute at Butantan, the recognized procedure being to bring the patient and the snake up together so that there may be no doubt as to the antivenom to be employed.

The paper is full of interest

H. Harold Scott

FINNEY (W. P.) **Rattlesnake Bite. Report of a Case**—*Proc Staff Meetings of Mayo Clinic Rochester* 1928 Sept 12 Vol 3 No 36 pp 272-273

In this case the patient, an expert snake-catcher had the inevitable hair's-breadth escape fortunately little more than a scratch—not a fair bite—on the forefinger from a big rattlesnake. The arm swelled and since he sucked the wound the lips and tongue also became swollen and numb. He scarified and iodined the wound and 5½ hours later had professional treatment, including antivenin. Subsequently the swelling and extravasation spread to the shoulder and there was slight haematuria and epistaxis, but the patient did not complain much of pain. It was noticed that at one time the red cells dropped to 2,720 000 and the leucocytes rose to 17 900 and the platelets to 70 000. Patient said he felt quite well after 5 or 6 days.

A. A.

DOUGHERT (J. Frank) **Rattlesnake Bite.**—*California & Western Med* 1928 Oct Vol 29 No 4 pp. 237-240 With 2 text figs [13 refs.]

Two fatal cases of bite by rattlesnake occurring at end of February and middle of March (when after hibernation, the venom would probably be very active)

In the first a 3-year-old boy was bitten three times on the left leg. The limb was ligated and the wounds were frequently sucked. At about half-an-hour the whole leg was swollen and ecchymosed (the swelling subsequently spreading to the hip) the patient being conscious, now lethargic and now excited the wounds were then incised and treated with solid KMnO_4 . At 6 hours 10 cc of the viperine antivenom issued by the Paris Pasteur Institute was administered and subsequently, caffeine was given hypodermically every half hour. But the little patient became weak and died comatose [interval not stated]. In the other case a girl of 20 years was bitten on the dorsum of the right foot. A ligature was improvised at once. At 1½ hour the foot and leg were swollen and discoloured but the heart beat was good the wounds were then incised. At 2½ hours 10 cc of a specific antivenom were injected under the skin and subsequently the ligature was intermittently relaxed. At 5 hours abdominal cramp occurred and the swelling leg now hyperaesthetic was again incised. At 8 hours the cramp was very severe and vomiting occurred the patient being pale and cyanotic the pulse and breathing quickened and numbness spreading up the leg. Stimulants—adrenalin camphor and caffeine were given. At 17 hours death came the mind being clear to within five minutes.

The author has analysed and tabulated the significant facts relating to nineteen recorded fatal cases of bite by rattlesnake

A. A.

JACKSON (Dudley) & HARRISON (W. T.) **Mechanical Treatment of Experimental Rattlesnake Venom Poisoning.**—*Jl Amer Med Assoc* 1928 June 16 Vol 90 No 24 pp 1928-1929 [1 ref.] [Hygienic Lab US Public Health Service Washington DC]

The mechanical treatment here tested was after applying a ligature to make numerous small incisions into the subcutaneous tissue of the area into which the venom had been injected and then to apply suction by the usual means of inverting a funnel connected with a rubber bulb

over the scarified area, the section being repeated at intervals during 20 to 30 hours. A dog that had received 4 minimum lethal doses of rattlesnake venom was recovered by this treatment begun an hour after the dose had been injected, and the life of two other dogs was much prolonged by similar treatment.

A. A.

NICHOLLS (Lucius) "Massage in the Treatment of Venomous Snake-Bites. — *Indian Med Gaz* 1928. Oct. Vol. 63 No. 10 pp. 574-575

The author has seen general massage practised by "bush doctors" in the West Indies as good medicine for snake-bite, and he seems to think rather nobly of it, as tending to divert the venom away from the "vital" viscera to the muscles.

A. A.

MORITSCH (Paul) & PIRKER (Herbert) Zur Serumtherapie bei Bissen durch ostindische Vipern. [Serum Therapy in Bites by Javan Vipers.] — *Wien Klin Woch* 1928. Aug. 30 Vol. 41 No. 35 p. 1255. [6 refs.] [State Serotherapy Inst. Vienna.]

KRAUSS corroborated by Moritsch, has shown (see this *Bulletin* Vol. 24 p. 404) that South American anti-viperine (*Lachesis* and *Bothrops*) serums can neutralize the venom of the European viper and OTTO (Vol. 25 p. 292) that East Indian (Java) polyvalent antivenom, although it can neutralize European viper-venom to some extent *in vitro* cannot do so *in vivo*. The present author's experiments show that South American anti-*Bothrops* serum neutralizes East Indian viperine (*Ancistrodon*) venom *in vitro* when the two are left in contact for some time at 37° [C.] but not *in vivo*.

A. A.

PHILALEX (M.) & PASTEUR (F.) Action des rayons ultraviolets sur le sérum de la Vipère aspic. [Action of Ultra Violet Rays on the Serum of the Viper.] — *C R Acad Sci* 1928. June 18. Vol. 186. No. 25. pp. 1756-1758. [2 refs.]

The authors have shown recently that the ultra violet rays destroy the venomous and rabic antigens of viper venom without modifying its toxicity and they now show that the ultra violet rays have exactly the same effect upon the serum of the viper.

A. A.

RENAUD (Maurice) Pouvoir neutralisant des savons sur le venin de cobra (cryptotoxine venimeuse) [Neutralizing Power of Soaps on Cobra Venom.] — *C R Soc Biol* 1928. July 13 Vol. 99. No. 24 pp. 496-498. [3 refs.] [Collège de France Paris.]

VINCENT in 1907 discovered that oleate and palmitate and margarate of soda—in fact soaps in general—can under given conditions neutralize microbe-toxins, rendering them harmless though still capable of imparting immunity in repeated doses. Toxins thus disarmed yet still immunogenic he called cryptotoxins.

The present author experimenting with accurate doses of cobra-venom and solutions of palmitate of soda (or of the medicinal soap of the French pharmacopœia) finds that cobra venom also is detoxified by these solutions although the detoxification develops slowly. The mixture of venom and soap solution (maintained at a temperature of 38° C.) continues toxic for the first 4 to 6 days but after that time it becomes so innocuous that guineapigs can tolerate an injection corresponding to 40 lethal doses of pure venom. The neutralization of the venom occurs only in soap solutions of a certain concentration. Whether the detoxified venom is cryptotoxic and capable of imparting immunity is a question still to be determined by experiment.

A. A.

MORRISON (N) The Immunity to Adder Venom of Slow-worms, Frogs, and Toads. [Correspondence.]—*Nature* 1928 Nov 17 Vol. 122. No 3081 pp 769-770 With 2 text figs

The correspondent, who seems to be not aware that resistance to snake venom is a well-known phenomenon imparts the information that he has repeatedly made healthy adders plunge their fangs into frogs and toads and slow worm lizards without serious damage to any of those animals

A. A.

KANGRAGAT (Sanit) Recherches expérimentales sur les variations des venins des serpents venimeux et sur l'immunisation contre les venins des divers serpents venimeux au Siam. [Experiments on Snake Venom and Immunization in Siam.]—*Rev Path Comp et Hyg Gén* 1928 Nov 5-20 Vol. 28 No 360-361 pp 1082-1087 [10 refs.]

There is nothing new or suggestive in this paper which merely contains diagnoses of 4 of the commonest and most notoriously deadly Oriental snakes—here said to be the dangerous snakes in Siam, and summarizes some experiments illustrating the ultimate effects of their venom and the corresponding antivenom

A. A.

BOGUET (A.) Sur l'adsorption du venin de cobra et de la toxine diphtérique par le charbon [Adsorption of Cobra Venom by Charcoal.]—*C R Acad Sci* 1928 Nov 19 Vol. 187 No 21 pp. 859-861 [2 refs.]

In the author's experiments 1 gm. of sterilized charcoal is suspended in 50 cmm. of a saline solution of 50 mgm. of dry cobra venom, and the mixture is left for two hours either at room temperature or otherwise, and then is filtered. The filtrate is perfectly harmless even in subcutaneous injections corresponding to 125 lethal doses of venom when injected into guineapigs and mice. The adsorptive property of the charcoal is also efficacious *in vivo* upon as much as 2 lethal doses of venom, if the charcoal (in suspension) be injected either simultaneously with the venom under the skin of the animal, or up to six minutes after the venom if by intraperitoneal route. Venom inactivated by charcoal imparts little or no immunity against pure venom however—even after two successive injections have been received.

A. A.

DE MAGALHÃES (Octavio). Contribuição para o conhecimento da intoxicação pelo veneno dos "escorpiões." [Poisoning by Scorpion Venom.]—*Mem. Inst. Oswaldo Cruz*. 1928. Vol. 21 No. 1 pp. 5-153. With 25 figs. & 4 graphs on 12 plates. [108 refs.] French summary pp. 155-159

The author has studied the venom of *Tityus bahiensis* *T. serrulatus*, *T. doronimaculatus*, and *Bothriurus* sp. incert. The venom of 13,640 individuals has been tested on 97 species of animals, from protozoa to man. The adult, but not the new-born, Armadillo (*Tatus novemcinctus*) is entirely immune and the domestic fowl, the guineafowl, the turkey, the vulture and the *serapitea* and *jacu* possess a certain amount of immunity but the scorpions themselves do not seem to be immune to their own specific venom. In all four species the venom is characteristically neurotoxic for both the cerebrospinal and the sympathetic systems. Its effects upon the former are seen in various forms of locomotor paralysis, and in nystagmus, blindness, and sensory disturbances its effects upon the sympathetic system are manifested in diarrhoea, polyuria, abortion, and affections of the lacrymal glands and milk-glands. The venom of *Tityus bahiensis* and *T. serrulatus* also contains haemolysin, haemorrhagin and lipolysin, and that of *T. serrulatus* is also proteolytic. Effective specific antivenoms have been prepared by the author. Tyrosin has a decided, and dahlia-juice a slight neutralizing action on the venom.

A. A.

LEXIS (K. U. A.) Some Observations on Scorpion Poisoning.—*Jl. Port-of Spain Med Soc* 1927 pp 176-184

Scorpion-sting is not uncommon in the Manzanilla District of Trinidad. The annual average number of deaths for the last five years was 4-8. During the last three years the author has treated 71 cases, and deaths among them include two adults. The burning pain of the sting soon passes off, leaving no local effects but, usually within half an hour a general intoxication is made manifest in nausea, intractable vomiting, difficulties of respiration, and cardiac and epigastric distress. There is always great restlessness, and in cases of one class this may pass into convulsions and unconsciousness, or even into manic disorder. Frequently there is a considerable, but transient, rise of temperature, and it is not uncommon to find sugar in the urine. For local treatment the author prefers injections of colloidal manganese as being painless for stimulants, aromatic spirit of ammonia, and if necessary adrenalin for convulsions, morphine or hyoscine and for general comfort, chlorodyne.

A. A.

SACÓX (Jorge J.) Sobre un caso mortal y otro grave de picadura de escorpión. [Two Cases of Scorpion-Sting, One Ending Fatally]—*Revista Med. Argentina* 1928. Aug. 10 Vol. 15 No. 7 pp. 302-309 [16 refs.]

In the Province of Corrientes, where these cases occurred, scorpion sting is regarded as mortal to children under three years, but as more or less trivial in adults.

One patient, a child of three years stung on the foot, died six hours afterwards. Intense local pain was soon followed by collapse. Treatment was by antivenin (snake) and stimulants. The other was a girl of eight years. After the initial pain came restlessness and symptoms of collapse. Treatment by antivenin, camphor, caffeine and adrenalin. In neither case were there convulsions, paralysis or the other symptoms produced experimentally in animals.

H. Harold Scott

HASE (Albrecht). Neue Beobachtungen ueber die Wirkung der Bisse von Tausendfüßsen (Chilopoda). Beiträge zur experimentellen Parasitologie. 2. [Effect of Bites of *Millipedes*.]—*Ztschr. f. Parasitenkunde*. Berlin. 1928. Vol. 1 No. 1 pp. 76-99. With 3 text figs. & 1 double plate. [17 refs.]

A prolix account, in minute trivial detail, of the localized and superficial erythema and petechial haemorrhage and the smart caused by the bite of a European species of the familiar cosmopolitan genus of small centipedes known as *Lithobius*.

A. A.

GIBB (Douglas F). Anaphylaxis from Pollen introduced by a Bee Sting.—*Canadian Med. Assoc. J.* 1928. Oct. Vol. 19 No. 4 p. 461.

In this case in a girl of 7 years a sting from a bee was followed immediately by a violent explosion of hay fever which subsided at once with the exhibition of ephedrine. Since the child had never shown any susceptibility to hay fever and since also the local season of wind borne pollen was past, the author concludes that the pollen was introduced by the sting of the bee.

A. A.

GAMINARA (A.). Le venin de la larve de *Megalopyge urons*. [Venom of the Larva of *M. urons*.]—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21 No. 8. pp. 658-662. With 2 text figs. [2 refs.] [Hyg. Inst. Faculty of Med. Montevideo.]

The author describes the effects on rabbits, guinea-pigs and white mice of the venom of the urticating bristles of the hairy caterpillar of the Megalopygid moth, *M. urons*. The bristles, which are implanted on tubercles having a definite arrangement, are connected with glandules. On man they inflict a painful urticarial or petechial dermatitis with ensuing numbness of the affected limb and in severe cases there may also follow excitement, convulsions, dyspnoea, and vomiting. The guinea-pig and mouse are particularly sensitive to the venom. In them it causes convulsions, hiccough and intense dyspnoea, auditory hyperaesthesia, and finally coma and death in convulsions—the heart still beating. The venom, in short, is not a mere vesicant but is a true animal venom of the same class as the venoms of hymenoptera, spiders, scorpions, and snakes. The author's conclusions are confirmatory of those of other observers, particularly as he himself states of those of FOOT for *Megalopyge opercularis* (*Journ. Exp. Med.* Vol. 35 1924).

A. A.

THOMAS (E.) Action pharmacodynamique du venin de *Lathrodectus mactens*.—C R Soc Biol 1928. Nov 9 Vol. 89 No. 31 pp. 1431-1433.

— Sérum actif contre le venin de l'araignée *Lathrodectus mactens*. [The Venom of the Spider *Lathrodectus mactens*.]—*Ibid* pp. 1433-1434

The author's experiments with the venom of the spider *Lathrodectus mactens* are confirmatory of the observations already recorded by others—except that they do not support the evidence of the hæmolytic power attributed by HOUSSEY and NEGRET. The venom causes intense pain, salivation and lacrimation, difficulty of breathing due to spasm of the bronchi, and (in lethal doses) death in asphyctic convulsions. Injection of 0.5 mgm. intravenously killed guinea-pigs of 600 gm. in less than two hours, and subcutaneously in twelve hours. Injection of 2 mgm. intravenously into a dog caused in addition to the other symptoms, loss of equilibrium and copious bile-stained vomiting, the animal being extremely weak on the following day.

The author obtained an efficient antivenom from rabbits immunized by a course of 14 gradually increasing doses (0.5 to 3.0 mgm.) of venom extending over 37 days.

A. A.

DURIG (J. V.) & JONES (Gwen) The Venom of the Stone Fish *Synanceja horrida*.—*Mem. Queensland Museum*. 1928. June 16. Vol. 9 Pt. 2. pp. 136-149

The authors describe (with figures) the anatomy of the dorsal spines of this Indo-Pacific fish and the histology of the venom-sacs connected with those spines and they record their experiments with the venom; they also give attention to certain other cutaneous glands and tubercles, the latter secreting a milky fluid which also may perhaps, be poisonous.

The distribution and size of the venom-sacs is variable—one specimen had none at all. A subcutaneous injection, into a guinea-pig, of 0.1 cc. of a 1 in 10 saline solution of the venom from a single fish caused, in the course of an hour paralysis of all the limbs and difficulty in breathing—the effects lasting for more than 8 hours—hæmolytic effects were also observed. After recovery some degree of immunity was noticed.

An account follows of a case of a man who trod upon a stone-fish and was wounded in the sole by the dorsal spines. The penetration of the spines caused intense pain, followed by nausea and collapse. The man recovered sufficiently to drag himself a hundred yards to his home where he fainted again. Seen 3 hours afterwards his foot and his leg as far as the knee were enormously swollen, his temperature was 102.4 F., and he was in agony. Some 44 hours afterwards he was removed to hospital still in agony and there when the swelling was tickled the whole skin of the foot and shin was found to be the outer wall of a bag of pus. Subsequently a large patch of skin over the instep sloughed away.

Under appropriate treatment the patient made good progress until the 14th day after the accident, when he suddenly "felt as though a box constrictor" had got him round the waist and was squeezing the breath out of him, and fainted with the pain. He recovered after treatment but stiffness and soreness about the epigastrium lasted for four days during which the patient had four fits of dyspnoea. The surgeon who treated the case seems to have thought that this terrible attack of dyspnoea was

not directly due to the venom since he treated it with tetanus antitoxin but the authors are not inclined to agree with this explanation. Altogether the patient was incapacitated for more than four months

A. A.

DUNIG (J. V.) & JONES (Gwen) Haemotoxin of the Venom of *Synanceja horrida* — *Australian Jl Experim Biol & Med Sci* 1928 June 16 Vol. 5 Pt. 2. pp 173-179 [9 refs.] [Hosp for Sick Children, Brisbane Queensland]

Synanceja is one of several Indo-Pacific Scorpaenid fishes that have poison-glands in the skin enveloping their spinous dorsal fin. The authors have already reported that the poison in its effects is similar to cobra venom and to curare and in the present paper they describe its haemolytic properties

A. A.

HISTORICAL.

KORTENHAUS (Friedrich) *Das Wechselfieber in der Rheinprovinz und sein Verschwinden* [Intermittent Fever in the Rhine Province and its Disappearance.]—*Arch f Geschichte d Med.* 1928. Vol. 20. No 2. pp. 120-136. With 2 plates (1 map) [18 refs.] [Hyg. Inst., Univ. Cologne]

During the 18th century and the first half of the 19th, the Rhine Provinces suffered from a series of epidemic waves of malaria recurring after intervening periods of quiescence. One of the worst of these outbreaks commenced in 1825 and flared up again each summer until 1828. Although the low lying and marshy regions suffered most, in the plains the amount of sickness exceeded all records for the foregoing fifty years, and even mountainous regions unaffected within the memory of man were invaded. In Coblenz where the disease had been unknown for 100 years one out of every three cases of fever was malaria. It is recorded in 1828 that no place in the whole plain of the lower Rhine was unaffected. After this year malaria receded until it was found only in its old endemic centres. From one of these, Aix-la-Chapelle, another epidemic started in 1834 spread far and wide and in parts attacked a third of the population. The reports stress the peculiar obstinacy of the fever and a larger dosage of quinine than usual was necessary to control it. Similar outbreaks recurred annually beginning at the end of March increasing rapidly and commencing to die down from the end of August. By 1841 malaria had again abated, but a new wave starting from Dinseldorf, spread over the country in 1843 and reached its maximum intensity in the following year. So usual was it for all the occupants of a house to be attacked at the same time that the populace suspected a spread by direct contagion. In 1845-46 cases were reported only from the endemic regions, and from this point the disease steadily declined until to-day the population of the Rhine provinces have even forgotten the once-familiar name *intermittent fever*.

Stagnant water and marsh-land were held responsible for the prevalence of malaria, and both State and local authorities constantly took fresh measures to encourage drainage and as a result, large tracts of marsh were converted into arable land and shallow lakes drained, as part of a deliberate policy which had still other effects for it improved agriculture and lessened poverty. Writing in 1844 Professor Marx, of Götting University said: "If one labours continuously at the carrying off of stagnant water and prevents further collections. If in districts where rice and hemp cultivation are spoiling the air care is taken to plant trees. If surface drains are kept clear old town-moats filled in, and efforts made at the same time to provide clean drinking-water good food and dwellings, the cold fevers [malaria] cease even when they appear to have acquired indigenous rights. And in the same year HERSINGER suggested that what was called "miasma" might turn out to be a poison or a parasite."

MÜLLER (Martin) Ueber eine Malariaepidemie zu Mannheim im Jahre 1761 [A Malaria Epidemic at Mannheim in 1761.]—*Arch f Geschichte d Med* 1928 Apr 1 Vol. 20 No 2. pp. 137-149 [Refs in footnotes.]

In a volume recording his observations on medical science Freidrick Casimir MEDICUS gives a most painstaking account of the great epidemic of malaria in Mannheim in 1761 where he was then Court and Garrison Physician. His detailed reports deal with the 1,228 soldiers who were treated in the military lazaret of whom 14 died civilian cases are mentioned only in passing as these were not under observation in hospital. MEDICUS described the epidemic with careful exactness in the belief that the malignant symptoms he encountered indicated a new form of intermittent fever.

The severe cases occurring in the late summer were *quotidiana* in type with sudden seizures of a convulsive nature. They *lost immediately* all motion, hearing speech sight and feeling and in these attacks he sees the special character of the outbreak. In most there was an unnatural convulsion of the whole body in some however only certain parts were affected trismus is noted also rigidity of the neck and opisthotonos. After 36 hours he says the condition passed and a clammy sweet-smelling, cold sweat followed.

The epidemic began at the end of July and lasted until the end of November. Weather reports are given for every day and these record unusual and prolonged heat, to which, operating through the medium of the water in the town moat, he attributes the violence of the epidemic, and notes that the soldiers on the ramparts were the most liable to attack. Only influences of an inorganic nature arising from the water are considered as causative agents and there is no mention of LANCISI's theory, published nearly 50 years earlier of a connexion between water gnats and fevers.

In addition to the usual therapy of blood letting purging etc. based on theoretical humoral pathology MEDICUS administered cinchona bark with great vigour to all the malaria patients in the lazaret without exception, a startling and momentous innovation for according to the accepted teaching the bark was a dangerous remedy if employed for other than carefully selected cases. But MEDICUS chose to follow the guidance of his own experience rather than the theoretical preconceptions of others to the great benefit of the sick in his charge and to the enlightenment of his fellows.

W P MacArthur

HILDEBRAND (Philipp) Zur Geschichte der Malariaformen. [History of the Forms of Malaria.]—*Muench Med Woch* 1928 Jan 20 Vol. 75 No 3 p 140 [6 refs]

Although the author has never discovered the term *tertiana duplex* in any medical writings of antiquity or of the middle ages he points out that it must have been in use at the period of the Renaissance for it occurs in a Latin epistle dated October 6th, 1562. The letter which he quotes in full, was written from Charlieu in France by Marius Antonius Muretus to Jacobus CANANO the physician, reporting his happy recovery from an attack of *tertiana duplex* but milder he says, than that for which CANANO had treated him three years before.

The type of malaria indicated by this name was known to the ancients as half three-day fever (*hemitriticus*) and was considered an

especially severe variety. It may be remembered, too, that when poor Sir John Falstaff lay a-dying in Mistress Quickly's tavern he is recorded, on the somewhat uncertain testimony of this lady to have been so shaken of a burning quotidian tertian that it was most lamentable to behold.

W P MacArthur

HOSIG (P J J) & SWELLENGREBEL (N H). Bijdrage tot de geschiedenis der malaria in Nederland, vierde mededeeling. [Contribution to the History of Malaria in Holland.]—*Nederl. Tijdschr. v. Geneesk.* 1928. Jan. 7 71st Year 1st Half. No. 1 pp. 38-47 [Numerous refs in footnotes.]

Continuing their series of articles on this subject (see this *Bulletin*, Vol. 22 p. 809 Vol. 24 p. 344) the authors searched for articles on malaria the numerous medical periodicals which were published in Holland for longer or shorter periods of times in the first half of the 18th century. Etiological knowledge and diagnostic methods were not much more advanced in those days than they were in the 18th century. Medical thought was still greatly under the influence of Galen's humoral pathology. The unity of miasmatic fevers, caused by a single agent was universally accepted.

Successively the authors deal with (1) Descriptions of epidemics (2) the diagnosis (3) the treatment and (4) the Zealand fevers.

The epidemics mentioned in the literature (Groningen 1826 Guel-ders 1831 Heilveetshuis, 1834 Bois le Duc Lekkerkerk, 1837 Arnhemuiden, 1843 Groningen, 1846) have certainly for the most part been epidemics of different affections appearing at the same period under the influence of various concurrent circumstances ("swamp nosocomiosis" as the authors called this epidemiologic unity in the previous article).

Differential diagnosis of intermittent fevers was still in a primitive stage the differential diagnosis "ex juvantibus" by means of quinine administration could only serve to make the confusion worse. Malaria was believed to have a very proteiform character and accordingly "made the scapegoat for professional doubt" which it unluckily has remained here and there till the present time.

Little uniformity in judgment existed as to the efficacy of quinine but the confusion of malaria with other diseases explains much in this respect. Later on quinine was more generally recognized as a useful drug. Not much disagreement appears to have existed as regards the dosage, 1 gram being generally administered.

The epidemic fevers in Zealand were generally called intestinal affections they were sometimes epidemics of benign enteritis, sometimes enteric or dysentery. The high mortality in Zealand had nothing to do with malaria.

W J Bahr.

SOZZANI (Giovanni). La malaria nel Mantovano. Storia e stato attuale. [Malaria in Mantua.]—*Supplement to Riv. di Malariologia.* 1928. Vol. 7 New Ser. No. 3. 90 pp. With 1 map & 3 text figs.

This essay opens with a brief history of Mantua in ancient times with many references which include the names of Livy Virgil, Pliny and Tacitus. Mantua, in Lombardy on the Mincio is a strongly fortified

city with river artificial lakes canals and swamps as additional defences. These latter while affording protection against human foes encouraged the mosquitoes and made the city and surrounding country very unhealthy. Dr Solani gives a full description of the topography and hydrography of the district in the earlier centuries and at the present time. In Chapter V we find early documentary evidence of malarial fevers in Mantua. Lodovico GONZAGA writes of *febres tertianas duplas* in 1369 and there follows a table of deaths from malarial fevers from 1496 to 1586. *tertian quarlan* and *double quarlan* are mentioned, and in four instances enlarged spleen is noted in the record. Accounts of epidemics of malaria are given for the 15th 16th 17th and 18th centuries. For the later years of the 19th century we get a table giving the verified number of cases in Mantua from 1890 to 1900. The number varied from 1675 in 1892 to 1998 in 1900.

Part II of Dr Solani's work deals with recent times and present-day scientific methods. No species of anopheles are mentioned except '*A. claviger* or *maculipennis*'. The organization of the provincial administration for fighting malaria is fully described with suggestions for improving local conditions.

J. H. Tull Walsh

- i. CELLI (Anna) Die Bedeutung der Malaria für die Geschichte Roms und der Campagna im Altertum und Mittelalter [The Significance of Malaria for the History of Rome and the Campagna in Antiquity and the Middle Ages.]—*Abhandl. ad Gebiete d. Auslandskunde Hamburg Univ.* 1927 Vol. 26 (D. Med. & Vet. Vol. 2) [Festschrift NOCHT] pp. 49-56. With 4 figs. on 2 plates & 1 map [34 refs.]
- ii. CELLI FRAENTZEL (Anna) Die Malaria im 17. Jahrhundert in Rom und in der Campagna im Lichte zeitgenössischer Anschauungen [Malaria in the 17th Century in Rome and the Campagna, in the Light of Present-Day Conceptions.]—*Arch. f. Geschichte d. Med.* 1928, Apr. 1 Vol. 20 No. 2, pp. 101-119 [Refs. in footnotes.]

With the publication of the late Professor Angelo CELLI's great posthumous work on malaria in Rome and its environs [see this *Bulletin* Vol. 24 p. 411] an enormous accumulation of material relating to the subject—the collections of a lifetime of ardent effort—was placed at the disposal of future students. It was only to be expected therefore that this vast treasury of information would be drawn upon and utilized further by his heirs and successors. The two papers under review are in fact based wholly upon his researches and are little more than annotated extracts—in German—from his larger work.

The titles of the papers explain their scope sufficiently and as their authoress is the widow of the original investigator and herself a German by birth, it may be taken for granted that his views are here expressed adequately though in language not his own. But to review these essays in detail would be superfluous since they contain nothing of importance that is not more fully handled in the work from which they are derived. To those who cannot consult the original sources, however they may be recommended as authoritative expositions of certain aspects of Angelo CELLI's views on malaria considered as a factor in Roman history.

Clifford Dobell.

WILLIAMS (Herbert U.) with the collaboration of RICE (John P.) & LACAYO (Joseph Renato) *The American Origin of Syphilis with Citations from Early Spanish Authors collected by Dr. Montejo y Robledo.*—*Arch Dermat & Syph.* 1927 Dec. Vol. 16, No. 6, pp. 683-696. [29 refs.]

The purpose of this most interesting paper is to present, for the benefit of Americans who do not read Spanish some evidence, published in that language in 1881 for the American origin of syphilis and the introduction of the disease into Spain by the ships' companies of Christopher Columbus. The authors begin with the old story that the disease first appeared in Europe in 1495 in French and Neapolitan armies contending before Naples and as a result became known, reciprocally on the one side as the Italian disease and on the other as the French disease the next step is to show that the Neapolitan army was reinforced from Spain and the last step brings us to evidence purporting that the disease had been brought into Spain just before by sailors infected in the New World. This evidence which has already been made known in England, was brought forward in 1881 by MONTEJO y Robledo and here consists of a brief abstract of MONTEJO's paper and translations of passages quoted by MONTEJO from five relevant writers either contemporary with or not much later than COLUMBUS in support of the main argument those writers being Gonzalo Fernandez OVIEDO y Valdes (1478-1557) Bartolomé de LAS CASAS or CASAUS (1474-1566) Bernardino DE SAHAGUN (1499-1590), Francisco HERNANDEZ (1514-1578) and Ruy Diaz DE ISLA (1539).

From the study of contemporaneous dictionaries MONTEJO assured himself that the American Indians had words equivalent to the Spanish word *bubas* by which syphilis is designated in the documents that he quotes, although as the present authors observe there is here a bare possibility of confusion with yaws. Their first witness OVIEDO states, in his *Historia general y natural de las Indias* that he was present in Barcelona as a page when Christopher COLUMBUS returned there from his first voyage of discovery, [1492-93] and also that in Castile he conversed with officers and others after their return in 1496 from the second voyage the gist of OVIEDO's story is that in the island of Haiti there was a horrible contagious disease *bubas* a disease for which specific indigenous remedies were well known which was very common among the Indians and that this disease was transmitted to some of the Spaniards who sailed with COLUMBUS and being spread in Spain at first among low persons afterwards extended among the people of higher rank and, furthermore that some among the Spanish army sent to the relief of Naples were touched with the disease and thus it was communicated through the women of bad conduct to the Italian and French armies there. LAS CASAS, who lived in tropical America for many years, states in his *Historia de las Indias* that an indigenous disease of the *bubas* which in Italy is called the French malady—a disease of immemorial antiquity for which divine Providence had provided a proper medicine—is very common among the Indians, who however were affected by it as little as if they only had smallpox he speaks of it as a thing well verified that the Spaniards acquired the disease and he has little doubt that it was in this way that the infection spread to the armies at Naples as already explained. DR. SAHAGUN in his *Historia universal de las Cosas de Nueva España* speaks of two kinds of *Bubas* as occurring in Mexico one

"very filthy" the other of less severity of which he gives the native names and those of the native remedies. HERNANDEZ who was physician to Philip II and was sent to Mexico to study the natural history of the country described, under its native name the plant used there for the treatment of the *bubas* the disease, synonymous with

French or Neapolitan malady which came out of these West Indies, where it has a special native and ancient name. DE ISLA author of a treatise on the new disease commonly called *bubas* in Spain and French and Italian disease elsewhere but which he prefers to call serpentine malady because it affrights the imagination like the sight of a serpent, says that it first appeared in Europe in 1493 at Barcelona having been introduced from the island of Hispaniola by the ships companies of COLUMBUS. The sailor men attributed it chiefly to hardships of the sea. DE ISLA also repeats the story of its further spread by infected members of the Spanish contingent sent from Spain in 1494 to assist the Neapolitans against the French.

The paper deals with some minor questions but for these and many other reasons it would be superfluous further to commend it for careful perusal.

A Alcock

EBSTEIN (Erich) Ein Brief von Otto Obermeier dem Entdecker der Rekurrensspirochäte [A Letter from Otto Obermeier the Discoverer of the Relapsing Fever Spirochaete.]—*Deut Med Woch* 1928 Mar 2. Vol. 54 No 9 pp 360-361 [1 ref.]

Otto OBERMEIER was born at Spandau in 1843 qualified in medicine in 1866-7 was attached as VIRCHOW's assistant to a hospital in Berlin, and when 24 years of age made his discovery not announced to the world till February 1873 when his paper *Die Entdeckung von fadenförmigen Gebilden im Blut von Rückfallfieberkranken* appeared. The contributor of the note says that OBERMEIER was the first to see living agents of disease in the blood of man. The letter to his brother and sister is concerned with domestic detail, but contains a passage about the spirochaete. After stating that he has found them also in mucus about the teeth he says that they are difficult to see in the blood but so characteristic that one can make the diagnosis at home without seeing the patient. In August 1873 cholera broke out in Berlin and OBERMEIER, who plunged into its investigation succumbed to it on the 20th of that month.

A G B

JOHANSSON (J W S) Notes on the Black Death in Danish Folklore and Tradition.—*Janus* 1928 Nov Vol. 32. No 11 pp 365-377 [47 refs.]

A Danish schoolmaster Kristensen by name, having spent his time in wandering over the country collecting folklore and traditions, left behind him many publications dealing with these affairs. Dr Johansson has assembled Kristensen's scattered references to plague and mainly from these notes though drawing on other sources as well, he has written an account of the Black Death as it was remembered in Danish tradition. Like Scotland, Denmark did not feel the full weight of the pestilence until 1350 but its virulence was unabated, as these chronicles amply testify.

Large tracts of country it is recorded, were depopulated to such an extent that the survivors had difficulty in finding one another. Bonfires were lighted on the hills at night to attract attention. Church bells were rung in the hope of a response from places where some person was still alive. and from high ground watch was kept for smoking chimneys. People without the vestige of a claim—except that of being alive—took possession of whole villages, and even of manors, the owners and all their blood relations having perished. There were not sufficient survivors to till the soil, and large areas of cultivated land reverted to forest.

Except for one reference to a black spot on the hand, and another to three red spots on the arm, the author has found no mention of symptoms. admitting his unfamiliarity with plague he suggests that these descriptions refer to buboes but a carbuncle and tokens, respectively would appear a more likely interpretation.

Owing to the multitude of deaths and the short duration of the disease most of those who perished died unfortified by the rites of the Church. In Northern mythology Odin brought sleep to Brunnhild by means of the hawthorn, and from some memory of this ancient belief the graves of the plague victims were planted with hawthorn to give their perturbed spirits eternal rest.

W. P. MacArthur

ZUBRICZKY (Aladar) *Histoire de la grande épidémie de lèpre en Europe* (History of the Great Epidemic of Leprosy in Europe.)—*Matériaux pour l'Étude des Calamités* 1926, Oct.-Dec. Vol. 3 & 1927 July-Sept. & Oct. Dec. Vol. 4, Nos. 11, 14 & 15. pp. 233-243, 133-143, 231-40. (Refs. in footnotes.)

The author of these papers, a professor of theology gives us an account of what is described as the great epidemic of leprosy in Europe, based on a mass of material gathered from old chronicles, and from monastic and other ecclesiastical records, all set out with a fine display of learning. His account however is vitiated in many parts and rendered suspect in others for he accepts every mention of the word *lepra* and its numerous congeners as equivalent to the precise usage of to-day whereas these terms were employed with such a diversity of meaning that no exact interpretation is possible unless sufficient additional evidence can be found in the context.

It is unquestionable that true leprosy existed in every country in Europe but only some small and uncertain proportion of those called lepers can have suffered from an infection with Hansen's bacillus, for almost any disease characterized by chronic scaly or ulcerative skin manifestations was in general regarded as leprosy. The idea which "*lepra*" conveyed to the ancient mind is clearly shown by the popular word commonly employed as a translation in Old English writings, "*scrofula*" that is, scurf and the scriptural epithet *alcerosus* applied to Lazarus who lay at the rich man's gate, was sufficient not only to label him as an unquestioned leper but also to furnish a new name for those afflicted with his supposed infirmity. Moreover the word leprosy was employed for maladies not leprosy even in the comprehensive acceptance then usual—"the leprosy that is called small-pox" of the *Annals of Clonmacnoise*—and also to indicate bodily affliction not the result of any disease in one familiar passage in Isaiah, said by

theologians to refer to Jesus of Nazareth the afflicted of the authorized English bible is rendered leprous in versions as late as that of John Wychl.

Again cutaneous diseases of animals and blight affecting crops were called leprosy and the confusion in nomenclature went so far that even elephantiasis—a word considered by Sir James Simpson positive proof that true leprosy is referred to!—came to be used as a synonym of mange as in de Blundevill's treatise on diseases of the horse where the chapter on mange is headed, The Leprosie or uniuersall manginnesse called of the old writers *Elephantia*.

It is in keeping with the author's uncritical method that the famous leper hospitals of Armagh should figure in his pages though here by still another curious error these imaginary institutions are transported to Innisfallen—the *Annals of Innisfallen* being the name of the chronicle supposed to record their existence. The reviewer has explained elsewhere the origin of this strange legend O'Connor misunderstanding the original Erse text, translated the archaic *derthightibh* (oratories) by the Greco-Latin *nosocomia* (hospitals) and Belcher in turning O'Connor's Latin into English, glossed *nosocomia* by leper houses and from this double mistake there arose these fabulous foundations—a pretty instance of history in the making and typical of much that is asserted regarding leprosy in old times.

If Dr Zubriczky had approached his subject in a more critical spirit, his recondite researches would have been of the greatest value to students of this branch of history as it is through his unquestioning acceptance of the written word, they cannot but mislead those who trust themselves to his guidance.

W P MacArthur

BAUMANN (E. D.) Ueber die Hundswut im Altertume [*Rabies in Antiquity*].—*Janus* 1928 Apr & May Vol 32. Nos 4 & 5 pp 137-51 168-85 [Refs in footnotes]

It is not remarkable that the history of a disease in which the sequence of events is so clear-cut and the incidents themselves, from the primary attack of the mad dog to the terminal catastrophe are so dramatic in their intensity should have its roots in the earliest literary records.

Baumann, in a scholarly review traces this history as it appears in classical literature. The only criticism which the reviewer has to offer is that it would have been easier to follow the record if a scale of reference had been supplied in the form of dates.

Although HOMER refers to mad dogs in the eighth book of the *Iliad*, and in a number of other verses uses the term *λυσσα* with reference to the frenzy of the gods the earliest Greek writers do not refer to the symptoms and the treatment of rabies. According to PLUTARCH the first definite reference to hydrophobia appears in the time of ASCLEPIADES. THEOCRITUS AESCHYLUS SOPHOCLES, EURIPIDES ARISTOPHANES and XENOPHON refer to the madness of wolves and dogs and ARISTOTLE in his *Historia animalium* describes rabies as a disease of dogs which causes furious symptoms and which is transmissible by biting to all animals with the exception of man. It would thus appear that the disease in man had not been identified with the disease in the dog owing probably to the different clinical features presented in the two cases. In the time of HIPPOCRATES a hydrophobic patient was considered to be suffering from a form of madness either

melancholic (Eudemus) or maniacal (Aristotle). Much stress was laid upon the symptoms of unrest and fear. The disease was one of the soul and not of the body. It might arise from a dyscrasia of the body fluids (black bile) as well as from the bite of a rabid animal. As a consequence of this view the condition was ascribed to demon possession. Even PLINY recommended the sacrifice of a red dog during the "dog days." The connexion between hydrophobia and the bite of a mad dog was probably first recognized by the Alexandrian school of HEROPHILUS and ANDREAS of Karytos (215 B.C.) was also aware of the relationship. Whether arising as the result of a dyscrasia or from the bite of a rabid animal the symptomatic features were the same—viz., a drying of the air passages and the stomach, leading to a disposition to cramps, and a fear of water—cold clammy perspiration, barking and howling like a dog, and finally death. The treatment was the prevention of draughts of air, the withholding of water, the administration of honey soaked in water, the application of poultices and ointments to the breast and abdomen. Amongst drugs given were treacle, hellebore and colocynth. CELSUS in his encyclopaedia goes into greater detail, and describes methods of cauterizing the bite. When symptoms of hydrophobia declared themselves he advised the immersion of the patient in a pool of water, pressing him under the surface until he swallowed water, and then raising him out of the water intermittently. In this manner it was claimed that both thirst and fear of water were alleviated. There was however a risk that the patient might die in clonic spasm. In the interval, he was placed in a warm bed, and treated with opium, cardamoms, castor oil, and a number of other drugs. This water cure again came into vogue in the sixteenth century but was opposed by PARÉ. In this connexion it is interesting to be told that in the ruins of Ostia an altar has been discovered bearing an inscription stating that it had been erected in the year 189 A.D. by one Ammon in honour of "the holy Nymph" who had cured him of a severe sickness. Carvings round the base of the altar show a dog running away and a man prone on the ground calling for help. From the inscription it appears that Ammon believed that he owed his recovery to a water cure.

PLINY believed that rabies was a disease of the "dog days" as a preventive he recommended that the excreta of hens should be mixed with the dogs' food. He believed that he could prevent the onset of symptoms in young dogs by excising the worm-like cartilage at the base of the tongue which had traditionally been mistaken for an actual worm. As a curative agent he recommended the administration of the root of the wild rose.

Various medicaments were administered by later writers mostly in the form of plasters.

Throughout the middle ages there is little evidence of advance in knowledge regarding rabies, and it was not until 1804 when ZIEMER succeeded in infecting a healthy dog with the saliva of a rabid dog, that rabies was proved to be an infectious disease. Finally in 1881 PASTEUR succeeded in preventing the onset of rabies by vaccinal treatment.

Such, in brief, is the historical record so ably set forth by Baumann, a record which shows how near to the surface the truth lay, and how the clarity of vision of the older writers was obscured by superstition in later times. The contagiousness of the disease was recognized before the commencement of the Christian era, although actual proof by

transmission was deferred until the beginning of the 19th century. That the causative agent was present in an invisible form in the saliva of mad animals was accepted some 2,000 years ago and to-day when we are able to see particles of matter some thousand times as small as were just visible in those days the causative agent is still invisible. Our technical advantages have aided us in a quantitative sense and only in that respect have we come nearer to the truth.

A. G. McKendrick.

BUTLER (C. S.) *Presidential Address.*—*Amer Jl Trop Med* 1928
Sept. Vol. 8. No 5 pp 363-370

The author makes fun of the belief that syphilis had its origin in America—he notes that leprosy, syphilis, gonorrhoea, chancroid and yaws were not differentiated till long after Columbus's time. He notes the fallacy that mercury will not cure yaws and says that United States Navy experience in Guam and Harti has given this a complete "knock out." With reference to the Oxford Dictionary he writes—

By means of the dated quotations from the medical literature it is possible to run down many of our medical fallacies and to place the responsibility for them where it properly belongs. It is rare indeed that a term such as influenza or yaws "can show an uncontaminated record as far back as three hundred years. A term will usually become more inclusive as it courses backward. Thus, when the term leprosy was incorporated into English from the Greek, it included several conditions which we now know are entirely distinct from true leprosy. So also with a great number of terms used in medicine."

The word syphilis was first used in English in 1718.

A. G. B.

LANE (John E.) *Bonomo's Letter to REDI. An Important Document in the History of Scabies.*—*Arch Dermat & Syph.* 1928. July
Vol. 18. No 1 pp 1-25 With 20 figs. [3 refs.]

Drawn by BEESON's sketch of the history of the study of the itchmite (see this *Bulletin* Vol. 25 p. 184) the author gives here a transcription of the original letter to REDI in which BONOMO described the itchmite and his observations of its life-history. He also draws attention to a paper published in the *Philosophical Transactions of the Royal Society* 1703 Vol. 23 in which Dr. Richard MEAD gave an abstract of the important part of BONOMO's letter and he adds a transcription of the original paper as published.

A. Alcock.

AGRAMONTE (Arnside) *A Review of Research in Yellow Fever.*—*Ann Intern. Med* Ann Arbor 1928. Aug. Vol. 2. No. 2
pp. 138-154 [20 refs.]

A historical account of yellow fever investigations with special reference to the earlier work and the way in which the method of transmission was discovered.

E. Hindle.

YELLOW FEVER.

HINDLE (Edward) An Experimental Study of Yellow Fever — *Trans. Roy Soc Trop Med & Hyg* 1929 Mar 9 Vol. 22 No 5 pp 405-430 With 1 text fig [18 refs]

The author describes the results of the investigations which he has been carrying out at the Wellcome Bureau of Scientific Research in London. The virus employed was the West African one previously referred to (see this *Bulletin* Vol 25, p 539). It was maintained by passages in *Macacus rhesus* and the mosquito *Aedes aegypti*. It is interesting to note that though the virus in the first place had been obtained from a very mild case of yellow fever at Dakar it proved to be highly virulent to monkeys. As a routine method of passage in the monkey the inoculation subcutaneously of 0.1 gram of liver ground up in normal saline was adopted. This constantly produced a fatal infection, the course of the disease being that described by the Rockefeller Commission in West Africa and other observers. It was noted that the liver, spleen and kidneys of animals which had died of the disease varied as regards virus content between 1,000 and 100,000 lethal doses per gramme, the average being 10,000. The amount of virus inoculated had little or no effect on the subsequent infection except in cases in which the dose was 0.0001 grams when the incubation period was prolonged. In two instances this dose produced no sign of infection, but the animals were found to have acquired an immunity as evidenced by their resistance to subsequent inoculations of large quantities of virus. The virus appears to multiply in the animal's body till its death, thus differing from its behaviour in human beings in whom it disappears in three days not only from the blood but according to ARICHO probably from the organs also.

Frozen virus maintains its virulence for eighteen days after which it acts as a vaccine. Similarly virus completely dried in vacuo and kept absolutely dry remains virulent for at least three months, after which its virulence diminishes till it ceases to be infective, but nevertheless confers an immunity.

Transmission from monkey to monkey was readily effected by the mosquito *Aedes aegypti*. Of six monkeys infected by the bites of an African strain of this mosquito two recovered from the disease. In one case a fatal infection resulted from the bite of a mosquito which lasted only two to three seconds. One mosquito which had fed on an infected monkey 24 days before was dissected. One salivary gland was inoculated into one monkey and the gut contents, excluding the proboscis and oesophagus, into another. Both animals died of the disease. The contents of mosquitoes were proved to be infective three and eight days after an infective feed and before they had become capable of transmission by the bite. It was also shown that the abdominal contents of mosquitoes were infective thirty-five days after they had ingested virus. The severed legs of two mosquitoes failed to produce infection, while the abdominal contents did so. This may indicate that the virus, though present in the organs, may be absent from the coelomic fluid. In view of the possibility of the spread of yellow fever to the Orient the experiments with an Indian strain of *Aedes aegypti* are of importance. This strain was found to be capable of transmitting the disease though there was some evidence admittedly not conclusive that it might not be so efficient as the African strain.

On the subject of immunity mention is made of the well-known fact that an attack of the disease is followed by a lasting resistance to further infection. Furthermore it is known that the serum of recovered cases will protect monkeys against infection. This fact has made it possible to recognize as yellow fever cases which on clinical grounds alone might not be suspected. The author and his assistant after illnesses of undetermined nature were found to have had atypical infections, as proved by the protective property of their sera after recovery.

As regards immunity in monkeys, it was noted that the liver and spleen of recovered animals which were removed from the body after perfusion with Ringer's solution to remove all trace of blood were capable of vaccinating against the disease. In certain animals which had been hyper immunized by repeated inoculations of infective liver the inoculation of a large dose of infective liver was followed by rapid death in 48 hours from what appeared to be a peculiar type of anaphylaxis.

On the subject of vaccination the results previously described (this *Bulletin* Vol. 25 p 539) have been confirmed and extended. In consequence of the variation in the virus content of the liver of monkeys which die of the disease it was decided to use for vaccine purposes only those livers which contained at least 10 000 lethal doses per gram. On two occasions vaccines prepared from livers with less than this amount did not give protection in a dose of 1 cc. It was found that the best method of obtaining virus from the liver was by cytolysis. To effect this ground up liver is mixed with 9 per cent. sodium chloride. After some hours in the ice chest sufficient distilled water is added to reduce the salt concentration from 9 per cent to 0.9 per cent. The sudden change in osmotic pressure causes the cells to swell and burst liberating the contained virus the virulence of which appears to be unaffected. It is pointed out that the protection afforded by formalized vaccine is quite as good as that given by the phenol glycerine vaccine. The amount of formalin now recommended (2 parts per 1 000 to a 20 per cent suspension of liver and spleen) is double that mentioned in the earlier paper. It was further shown that the phenol glycerine vaccine was potent when dried after removal of the glycerine by dialysis. Attention is drawn to the fact that the test which was employed to determine the potency of the vaccines was a particularly severe one. This consisted in giving 1 cc of vaccine and ten days later not less than 1 000 minimal doses of virus in a saline suspension of liver. The interval of ten days is hardly sufficient to allow of the full development of immunity. It has been shown that the immunity conferred by vaccination will persist for at least four and a half months.

C. M. Wenyon.

MOUCHET (R.) Rapport sur l'épidémie de fièvre jaune dans le Bas-Congo (Boma et Matadi) [*A Report on the Yellow Fever Epidemic in the Lower Congo (Boma and Matadi.)*—*Ann Soc Belge de Méd Trop* 1928 Sept. Vol. 8, No 2, pp 219-232.

An interesting and detailed account of the outbreak of yellow fever at Matadi and Boma in December 1927 and January 1928. This seems to be the first epidemic of the disease recorded from the Congo and from a history of the cases there is little doubt that the infection

was introduced by steamer from Dakar. At Boma there were only three cases—two imported and one local—and no natives were affected. At Matadi there were 19 cases amongst Europeans (and 3 uncertain); 8 recovered and 11 died. Twenty natives became infected, of whom 6 recovered and 15 died. There were no cases amongst the 53 European children although there were 5 cases among 138 women and 17 amongst 407 men.

The high mortality amongst the natives is noteworthy as it shows that they do not possess any more natural resistance to this disease than Europeans. When any marked discrepancy exists between the mortality of Europeans and natives it indicates the existence of an endemic area in which the natives have become immunized as the result of previous exposure to infection.

The situation at Matadi is considered somewhat unsatisfactory as it is difficult to control the movements of the natives in a port of this nature and the occurrence of the cases recorded above indicates the danger of the disease having become established in the native population and the possibility of it being carried on to the next rainy season.

E. Hindle.

FRAGA (Clementina) The Yellow Fever Epidemic at Rio de Janeiro.—*League of Nations Monthly Epidemiol Rep* 1928 Oct. 15 Vol. 7 No. 10 pp. 375-378. Also in *Public Health Rep* 1928 Nov. 23. Vol. 43 No. 47 pp. 3079-3083.

— Quelques notes sur l'épidémie de fièvre jaune à Rio de Janeiro.— 16 pp. With 6 plates. 1928 Rio de Janeiro. Also in *Bull. Acad. Méd.* 1929 Jan. 15 Year 83 3rd Ser Vol. 101 No. 2 pp. 82-89 With 6 text figs.

— Sobre o surto epidêmico de febre amarela no Rio de Janeiro.—*Bol. Oficina Sanitaria Panamericana*. 1928. Dec. Vol. 7 No. 12 pp. 1535-1548. With 7 figs.

In 1903 as a result of an intensive campaign since 1903 yellow fever disappeared from Rio de Janeiro and since then only very rare cases have been recorded. In May 1928 it reappeared in the city and 108 cases were recorded during the summer as follows: 1 in May, 55 in June, 40 in July, 8 in August, 4 in September. The first and second cases were soldiers from the barracks and confirm the suspicion that the disease was introduced by recruits from endemic foci in the north of the country. 78 per cent. of the cases occurred in foreigners, who only constitute 21 per cent. of the population in Rio. Moreover the case fatality among foreigners, 62 per cent. was nearly double that among natives, 32 per cent., indicating the presence of a much greater resistance to yellow fever amongst the latter. The general mortality rate was 55.5 per cent. According to Dr. S. LIMA who gives a description of the symptoms of the disease clinically the cases fell into three groups:—

1. *The attenuated or renal form.* After two or three days of general sickness with ocular congestion and vague discomfort, the local reaction sets in with sudden albuminuria, accompanied by hyaline and granular casts and in grave cases of anuria by occasional blood cells. The disease may be arrested at this point, with moderate fever, slight sub-icterus of the conjunctivae, traces of haemorrhage and always with marked nephrosis.

2. *The hepato-renal form.* In these more serious infections which are the commonest the liver also reacts and nephrosis, jaundice and haemorrhages are observed. The icterus is not very pronounced, and is always followed by haemorrhages (nasal labial or gingival intestinal and gastric) preceded and accompanied by intense nephrosis. The pulse is nearly always slow in relation to the temperature and a divergence of the two is always a bad sign.

3. *The hypertoxic form.* A malignant hepato-renal form in which death supervenes before icterus has become general. The symptoms are high temperature extreme agitation eyes much congested delirium sphygmothermic discordance epigastric anxiety oliguria or anuria convulsions enterorrhagia, and black vomit preceding death on the third or fourth day. Intense nephrosis is always found in these cases and if they have resisted one or two days they become malignant hepato-renal forms.

Treatment has been exclusively symptomatic.

Dr DIALHO made post mortem examinations of all patients that died in hospital and in all cases found the characteristic Rocha Lima lesions of the liver cells in a more or less intense form. The renal lesions although generally serious and constantly present were not very characteristic. Gastric and intestinal haemorrhages were frequent but not constant. A diffuse steatosis of the myocardium especially on the right side was almost always found. Hyperaemia of the olivae cerebelli with striking red spots was observed fairly frequently.

The disease was combatted by the isolation of all patients and extensive anti mosquito measures such as fumigation of the houses and destruction of the larvae. As a result of these activities the mosquito index rate was reduced to 2 per cent. so there is every prospect of the disease being eradicated from Rio. At Nilopolis a small town not far from the capital there were a few cases of yellow fever treated by convalescent serum and also by a specific yellow fever vaccine prepared by Dr ARAGÃO. This is a modification of the formalinized vaccine recommended by HINDLE [this *Bulletin* Vol. 25 p. 539]

E. H.

DA CUNHA (A. Marques) & MUNIZ (Julio) [In Portuguese & English] *Notas sobre a febre amarela. Notes about Yellow Fever—Inst Oswaldo Cruz Suplemento das Memorias.* 1928. Oct. 15 No 2. In Portuguese pp. 47-50 In English pp. 51-54 With 8 charts on 2 plates.

The authors carefully examined cases of yellow fever both during the attack when the blood is known to be infective and also in the later stages in order to see whether leptospira ever occurred as a secondary infection. Various culture methods were employed and the results were uniformly negative. Details are given of the results of inoculating monkeys with the virus and the symptoms produced. The course of the disease varied, one individual having an incubation period of 10 days and another succumbing without showing any very marked rise in temperature. The necrosis of the liver cells was found to be absent in two monkeys which were proved to be infected with the disease, thus calling attention to the difficulty of recognizing some cases even after pathological examination.

E. H.

LEGER (Marcel) *Etat actuel de nos connaissances sur l'épidémiologie de la fièvre jaune. [The Present State of our Knowledge of the Epidemiology of Yellow Fever.]—Gaz. hebdomadaire de Médecine de Bordeaux.* 1928. Nov 11 Vol. 49 No. 46 pp. 731-733.

A brief and accurate summary of the present state of our knowledge, together with some interesting suggestions. As to the reason why yellow fever is absent from so many countries where the transmitting mosquito is abundant and other conditions seemingly favourable the author aptly remarks that it is far too simple an explanation to assume that the mosquitoes have never had a chance of becoming infected by feeding on cases during the infective period.

E. H.

KUCZYNSKI (Max H.) with HORNADÉL (Bianca) *Untersuchungen zur Ätiologie und Pathogenese des Gelbfiebers. [Studies of the Aetiology and Pathogenesis of Yellow Fever.]—Klin. Woch.* 1929. Jan. 1 & 8. Vol. 8 Nos. 1 & 2 pp. 9-14 58-63. With 11 text figs. [20 refs.]

The first part of this article deals with the methods employed in obtaining cultures of an organism "*Bacillus hepatodystrophicus*" considered by the author to be the causative organism of yellow fever. The cultural methods, in the main, resemble those used for the culture of *Rickettsia* and *Bartonella*, described by the author in previous publications.

The most useful was a semi-solid physiological medium referred to as "MON" which has the following composition —

- 160 cc. normal saline
- 60 cc. ascitic fluid (unheated if possible)
- 40 cc. PGN
- 25 cc. Hottinger-agar or 21 Ams-agar

PGN is a physiological cell nourishing fluid of use for tissue culture, and consists of 1 per 1 000 peptone and 2.5 per 1 000 glycogen in Normosal (a physiological serum and salt mixture supplied by the "Sächsischen Serumwerke, Dresden).

In addition to MON another medium "N" previously used by the author for the cultivation of *Rickettsia*, was used in the present investigation. Its composition is as follows —

- 100 cc. distilled water
- 10 cc. Hottinger or 21 Ams Broth.
- 1 gm. normosal
- 10 cc. 3 per cent glycogen solution.

The whole mixed with one-third its volume of ascitic fluid

The authors employed the Sellards and Hindle strain of yellow fever which they had obtained from Paris. *Macacus rhesus* and *M. cynomolgus* were used for the maintenance of the strain, and as in the case of previous observers, the virus was found to be present in the blood and serum of infected animals as well as in the tissues.

In a preliminary discussion it is pointed out that yellow fever has an acute bacteraemic phase during which the blood is infective followed by a hepatodystrophic phase, the result of the injury to the liver and resulting in jaundice and acute atrophy of the liver. The inoculation of blood is preferred to the use of infected tissue for carrying on the

strain one of the investigators became infected as the result of pounding up infected liver in a mortar with tiny splashes of the material fell on his cheek. The other worker also became infected. Two strains were isolated from these patients and it is interesting to note that one of these the Hohenadel strain has proved to be much more virulent than the original one.

The pathological changes in infected monkeys are described with the object of showing that the disease can easily be diagnosed when other causes of the characteristic condition such as certain intoxications can be excluded.

The authors then proceed to describe the results of cultures put up from about 40 infected monkeys. Large numbers of these animals were found to have a latent infection with a very fine *Vibrio* or *Spirillum* named *Vibrio macaci* which readily grew in the culture media. This organism produced no obvious symptoms when inoculated into monkeys and also did not give immunity against yellow fever so it would seem to be non pathogenic.

Bacillus hepatodystrophicus the other organism was only obtained direct from infected animals in cultures of blood and tissues in MON. After a first culture had been obtained it could be transferred to a one eighth concentration of Hottinger Agar mixed with 40 per cent. ascitic fluid, if it was introduced together with NN. In this medium it simply grew as a sediment on MON the growth was at first superficial but in later passages extended downwards to the bottom of the tube. The cultures give off a peculiar unpleasant odour resembling the breath of yellow fever patients.

The culture is at first Gram negative but later gives variable results especially in old cultures.

The shape of the organism is extremely variable minute coccoid forms together with fine bacilli assuming irregular club shapes are seen in the original cultures. In NN delicate slightly curved bacilli, grow in little heaps. The size varies from 0.3 to 0.4 μ in diameter in the coccoid forms up to 1.1 μ long by 0.4 to 0.6 μ in the bacillary forms. The microscopic picture is said to resemble the cultures of Rocky Mountain spotted fever virus. It is noted that the presence of surviving tissue improves and strengthens the culture in artificial media, but is not essential. The virus is said not to persist in MON culture tubes for more than five days at 35° C. unless there is microscopical evidence of the growth of the bacillus.

The second part is concerned with the results of animal experiments but the authors first discuss the possibility of invisible virus accompanying the visible cultures, and it is pointed out that when obtaining successes up to the 15th generation of subcultures such an explanation is untenable. It is admitted, however that as in *Rickettsia*, in the overwhelming majority of cultures set up the virus dies out rapidly though in a few cases it adapts itself slowly to the culture medium and thrives.

Particulars are given of inoculations into monkeys of a culture (312) which up to the 11th passage preserved a relative virulence. In the first passage after keeping the culture 19 days in the incubator a monkey was infected and 13 days after inoculation died with symptoms of yellow fever. With subsequent passages the infections produced were non fatal and in some cases almost negligible in their symptoms but immunized the monkeys against subsequent inoculations of infected blood often in doses of 3 cc. The inoculation of carbolized

vaccine made from these cultures gave very uncertain results. Later another strain has been isolated in culture which even after many passages is said to produce serious infections in monkeys and even in the form of a carbolized vaccine is able to protect monkeys.

Finally a mixture of convalescent yellow fever serum with the culture virus when inoculated into monkeys produced no reaction nor any illness.

The authors attempt to explain the extremely variable results of their culture experiments, and consider that the organism varies considerably in its properties and only with difficulty becomes adapted to the artificial media in which it is grown.

E. H.

MONCORVO (Filho) Diagnostico diferencial da febre amarella na infancia. [The Differential Diagnosis of Yellow Fever in Childhood.]—*Brasil-Medico* 1923. Nov. 3. Vol. 42. No. 44 pp. 1234-1239

The symptoms of yellow fever may differ considerably in children from those seen in adults partly no doubt because the former are unable to describe symptoms such as headache, backache, general pains while general restlessness and rise of temperature are common to many infections in an early stage. Slight rise of temperature to 38° C. or so and early vomiting may be the only signs noticed.

The most important of the diseases which have to be distinguished from yellow fever and are discussed in this paper are (1) *Influenza* particularly in its severe forms. Though haemorrhages are uncommon, they were nevertheless seen in many of the more serious cases of the pandemic of 1918. Albuminuria at an early stage and black vomit, if present later are important points of distinction and jaundice is not common in influenza, but is present usually even though it may be very slight, in yellow fever. (2) *Malaria* particularly bilious remittent, may be distinguishable only by blood examination the two may possibly coexist. (3) *Digestive disturbances* in children may show vomiting, icterus and fever but not albuminuria nor haemorrhages. (4) *Plague* FERRARI in 1902 related the case of a child of 13 years who, he believed, was suffering from bubonic plague but on the sixth day black vomit appeared. (5) *Weil's disease* will probably not be differentiated except by laboratory examination—the presence of leptospira in urine and the spinal fluid, animal inoculation, etc.

Among other conditions mentioned as possibly causing difficulty are recurrent fever, phosphorus poisoning, angiocholitis [surely rare in young children] and diphtheria.

H. Harold Scott.

JAKOB FIALHO (A.) VILLELA (A.) & E. L. Alterações do sistema nervoso na febre amarella (Nota prévia) [Changes in the Nervous System in Yellow Fever. (Preliminary Note)]—*Brasil-Medico* 1923. Aug. 18. Vol. 42. No. 33. p. 923.

The authors have examined the central nervous system in 15 cases in the 1923 epidemic of yellow fever. They report a stenosis more or less intense in the cells of the cerebral cortex and in the subcortical zones in particular the corpus striatum and corpus dentatum. In addition they noted much fat in the neuroglia and adventitial cells of the vascular walls. Adjacent to the capillaries there were focal changes

with dissociation of tissue and slight glial proliferation more rarely small lymphocytic infiltrations nodularly disposed about the capillaries. Researches are being continued

H Harold Scott

LACORTE (José Guilherme) & VILLELA (Gilberto Cuimãraes) [In Portuguese & French.] O liquido cephalo-racheano na febre amarella. Le liquide cephalo-rachidien dans la fièvre jaune [The Cerebrospinal Fluid in Yellow Fever]—*Inst Oswaldo Cruz Supplemento das Memorias* 1928. Oct. 15 No 2. In Portuguese pp. 62-63 In French pp 63-64

— & — Le liquide céphalorachidien dans la fièvre jaune.—*C R Soc Biol* 1928 Nov 30 Vol. 99 No 34 pp 1663-1664 [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]

The authors examined the cerebrospinal fluid of ten cases of yellow fever during the recent epidemic in Rio. Apart from its high tension and increase in the albumen and chlorides no constant changes are recorded. The liquid from two patients with fever of less than 72 hours duration and from one patient after this period was inoculated into three monkeys with negative results.

E. H

CHAGAS (E.) Syndrome surrénal dans la fièvre jaune [The Supra-Renal Syndrome in Yellow Fever]—*C R. Soc. Biol* 1928 Nov 30 Vol. 99 No 34 pp. 1664-1665 [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]

The author observed a supra renal syndrome in 10 to 15 per cent. of the yellow fever cases during the recent epidemic in Rio. The symptoms were generally observed in non fatal cases and take about ten days to develop. The most marked features of these cases were a profound adynamic condition persisting during the convalescence associated with very pronounced dilatation of the peripheral vessels. There was also a fall in the arterial pressure from 100-70 mm to 50-30 mm. on the 2nd or 3rd day, which continued throughout the attack. Brachycardia, sometimes very pronounced up to 32 per minute is always present. Haemorrhages are not very extensive and considerable loss of blood has never been observed. Jaundice is somewhat in constant and almost always appears during convalescence. Death is generally the result of cardiac insufficiency. The appearance of patients is generally very striking because of the adynamic condition and depression but the evolution of the disease is said to be almost always benign

E. H

TORRES (C Magarinos) & DE AZEVEDO (A. Penna) Lésions des surrénales dans la fièvre jaune. [Lesions of the Supra-Renals in Yellow Fever.]—*C R Soc. Biol* 1928. Nov 30 Vol. 99 No 34 pp. 1673-1674 With 1 text fig [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]

The occurrence of symptoms indicating affection of the supra renals in the recent yellow fever epidemic at Rio de Janeiro [see above] suggested histological examination. The supra renals of nine patients dead of yellow fever were examined and necrosis of the cortex found to

be constantly present, eosinophile cells with pyknotic nuclei being very evident. The cytoplasm of the glomerular zone and fasciculi contained a homogeneous acidophile substance forming rounded masses surrounded by a clear halo. These masses stain a deep rose colour with eosin, and examined with a polarimeter are birefringent.

Similar acidophile bodies have been observed in a case of lobar pneumonia and of tuberculosis but are especially abundant in yellow fever cases.

E. H.

PENIDO (J. C. N.) [In Portuguese & English.] Observações sobre alguns elementos da urina na febre amarela. Observations on Some Elements of Urine in Yellow Fever.—*Inst. Oswaldo Cruz, Supplemento das Memórias*. 1928. Oct. 15. No. 2. In Portuguese pp. 65-68. In English pp. 69-72. With 5 graphs.

The urine of 20 patients in the recent Brazilian outbreak has been examined in detail. It was found possible to estimate the severity of a case by successive examinations of the urine. In mild cases, there was a high concentration of urea in the daily elimination whilst in fatal cases the opposite occurred. The elimination of chlorides is always very small and is inversely proportional to the urea. At convalescence there is an increase in chlorides and a decrease in urea. Uric acid and puric bases seem to be eliminated in a similar way to urea. Albuminuria and cylindruria generally appeared on the third day. Glycosuria was never observed. In the sediment large cylindrical cells were found, probably as a result of degeneration of the tubules of the kidney. The elimination of urine was found to be effected in the same way as in nephrosis.

E. H.

JUNGMASS (Paul). Zur Klinik des Gelbfiebers. Ein Beitrag zur Pathologie der Leber. [Clinical Records of Yellow Fever. A Study of the Liver Pathology].—*Klin. Woch.* 1929. Jan. 1. Vol. 8. No. 1. pp. 14-17. With 5 charts in text.

A detailed study of two cases of laboratory infection [see above, p. 297]. In both the patients seem to have acquired the disease by the splashing of infected material from monkeys in the course of grinding up tissues for inoculation.

Both patients showed fairly typical symptoms with the development of jaundice and albuminuria. The various features of the disease are discussed in great detail, with special reference to the general clinical pathology of the liver and kidney.

E. H.

FIALHO (Amadeu) BICALHO (Nair) & PACHECO (Graciella). Do conteúdo dos lipídeos no fígado humano no curso da febre amarela. [Amount of Fatty Substances in the Liver in Yellow Fever].—*Brasil-Médico*. 1928. Dec. 8. Vol. 42. No. 49. pp. 1369-1370.

The recent epidemic afforded an opportunity for chemical investigations of the tissues of fatal cases. This is a preliminary note dealing with a few cases and with the liver only. The method employed was

titration of 2 gm. of dried liver with a little washed and dried sand and the addition of anhydrous sodium sulphate. The fat was extracted by a Soxhlet apparatus in the usual way. The results varied within wide limits the lowest being 16 the highest 71 gm per cent. Fuller accounts and the results of examination of other organs will be published later

H Harold Scott.

TORRES (C. Magarinos) Sobre a necrose salpicada do figado na febre amarella. [Necrobiosis of the Liver Cells in Yellow Fever] —*Sciencia Med* 1928. Aug Vol. 6 No 8. pp 402-404
With 1 text fig English summary pp. 404-405

The author has examined the liver of 12 cases of yellow fever in the recent outbreak in Rio de Janeiro and in each found the scattered necrosis of the liver cells in the lobules which is such a characteristic feature of the disease and of great importance in *post mortem* diagnosis.

Occasionally in frozen sections recently fixed in neutral formalin and stained with dilute haematoxylin liver cells were observed in early stages of necrobiosis with oval shaped nuclei, 7.5 μ in diameter well preserved but much less rich in chromatin than normal liver cell nuclei which are also much larger 11.9 μ in diameter. Some of these cells with small nuclei contain large numbers of fat globules. The necrotic cells represent a further stage in the process of necrobiosis and are somewhat different from the necrotic liver cells in chronic passive congestion being smaller and showing a longer preservation of the staining properties of the nucleus.

In yellow fever the necrobiosis of the liver cells is said to be a peculiar slow one as compared with that associated with chronic passive congestion and common infectious diseases.

E. H.

TORRES (C. Magarinos) Sobre a degeneração oxychromatica da cellula hepatica como lesão característica na infecção experimental pelo virus brasileiro da febre amarella. [The Oxychromatic Degeneration of the Liver Cells as a Characteristic Lesion in Experimental Infections of the Brazilian Strain of Yellow Fever]—*Brasil Medico* 1928. Sept. 8. Vol. 42. No 36. p 1001 English summary pp. 1001-1002. [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]

The changes in the livers of *Macacus rhesus* and *M. cynomolgus* inoculated with the recently isolated virus of yellow fever from cases in Rio de Janeiro were found to be somewhat variable especially in respect of the acute necrosis and necrobiosis of the liver cells. One liver was found to show none of these changes and yet contained the virus as shown by subsequent inoculation. The only constant change observed was oxychromatic degeneration of the liver cells, with the development of acidophile intranuclear inclusions. These changes were not found in monkeys dying of tuberculosis or causes other than yellow fever

fection experiments and inoculated into 28 *M. rhesus* and 1 *M. cynomolgus*. Five of these patients had been ill for more than 72 hours and in every case their blood was negative and produced no symptoms when inoculated into monkeys. With the remaining 16 patients similar experiments gave varying results. In 4 monkeys a fatal infection was produced in other cases the inoculation of blood was followed by more or less typical febrile symptoms which immunized the animal against subsequent inoculations of the virus. On the other hand some of the inoculated monkeys succumbed to yellow fever when another dose of virus was injected. In one case the blood of a patient (who succumbed to the disease) injected into monkeys on two successive days caused death with the sample taken 36 hours after fever had begun, but the one extracted after only 10 hours produced only atypical febrile oscillation. This monkey however was immune against subsequent inoculations of virus. Of the 4 fatal infections in monkeys 3 came from mild cases and one from a severe fatal case. Infected blood kept in the ice chest was found to retain its virulence for 9 days, but had lost it after 14 days. The virus seems to be much less pathogenic to monkeys than either the Asiatic or the Sellards and Hindle strain. The author remarks that it is only rarely fatal and that 0.2 cc. of blood is the minimum lethal dose as compared with 0.0001 cc. for the African strain [HINDLE, this *Bulletin* Vol. 25 p. 539]. Mosquitoes fed on patients respectively 10 and 36 hours after the beginning of the attack were shown to be infective. The course of the disease in monkeys and the pathological symptoms resemble those previously described.

Thymus from seven patients who died of yellow fever on the 4th and 5th days of illness were inoculated into 9 monkeys, none of which became infected, thus confirming the view that after the third day the virus disappears from the human organism. The identity of the African and American strains of yellow fever virus was proved by a cross immunity experiment. Pieces of liver [infected with the African strain] preserved on ice were taken by Dr. CHAGAS to Rio and inoculated into two *rhesus* monkeys. Only one showed a slight febrile reaction, but both were immunized against subsequent inoculations of the Brazilian strain of yellow fever.

The protective properties of convalescent serum have been used by the author to confirm the diagnosis in doubtful cases of yellow fever. 2 cc. of the patient's serum is inoculated into a monkey followed by a lethal dose of virus the following day. If the serum protects the monkey against infection it is a sign that the patient had suffered from yellow fever.

Vaccination against yellow fever. The author prepared the glycerine and phenol vaccine recommended by HINDLE, and also another in which the glycerine was left out and replaced by 2 in 1000 formaldehyde. Both vaccines were found to protect monkeys against the disease but the latter was preferred for use in man as the absence of glycerine made it less painful. The vaccine is prepared as follows —

An infected monkey is killed shortly before death and the liver, kidneys, spleen and brain removed and carefully examined for any signs of secondary infection. If sound they are washed in sterile saline solution, wiped on filter paper and weighed. They are then cut up into small pieces and triturated in a mortar with sand. Each part of tissue is diluted with 5 parts sterile distilled water containing 0.5 per cent. phenol and 2 per 1000 formaldehyde and the mixture well shaken until homogeneous. The resulting liquid is filtered through four layers of gauze and the filtrate

kept in the ice box for 5 days when it is tested for sterility by inoculation into guinea-pigs and by culture methods. If sterile the vaccine is distributed into 2 cc ampoules and is ready for use. The dose in man is 2 cc given subcutaneously and care should be taken to shake the ampoule before use as a deposit forms.

The vaccine was first used for the protection of the staff of the Oswaldo Cruz Institute who were working with yellow fever and since it was found to produce no ill effects was then used by the Public Health Department in isolated foci of the disease. More than 300 persons have already been vaccinated, and in every case the inoculation has produced no troublesome reactions. Moreover none of these vaccinated persons has become infected although presumably some were exposed to infection. The Public Health Department are making more extensive experiments with the vaccine and 2,000 more doses are ready for use. [The results of these interesting experiments support the hope of anti yellow fever vaccine furnishing an effective prophylactic measure against this disease.*]

E H.

ARAGÃO (Henrique de Beaurepaire) Recherches sur la fièvre jaune. [Researches on Yellow Fever]—C R Soc Biol 1928. Nov 2. Vol 99 No 30 pp 1341-1343 [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]

The author has successfully inoculated the strain of yellow fever occurring at Rio de Janeiro into three species of monkeys viz. *Macacus*

The following extract suggests that some caution must be exercised in drawing deductions from such experiments

Practical application of the preventive vaccination with the killed cultures of *Leptospira icteroides* was first undertaken by Dr Pareja and the writer in Quito in non-immune soldiers who after a second vaccination, were sent down to Guayaquil where yellow fever was still prevalent (1918). Other soldiers and numbers of civilians were subsequently vaccinated (1919). Among the vaccinated the case incidence was about 11 per 1000 while among the non vaccinated it was about 110 per 1000. The concentration of the vaccine was afterwards increased many hundredfold, and trial was continued under the direction of Dr Theodore C Lyser of the International Health Board of the Rockefeller Foundation. Lyster Vaughn, Bailey and the departments of public health of Mexico, Salvador, Guatemala, British Honduras and adjacent countries vaccinated during the years 1920 and 1921 about 10 000 non-immune individuals residing in the infected areas of these countries. The reports show that none of the individuals who received two injections of 2 c.cm. of the vaccine contracted yellow fever while a few of those who received a single injection became infected later. Comparison of these figures with the number of cases which developed among the non-vaccinated population during the same periods and in corresponding localities was so striking that the protective value of the vaccine seems conclusively proven. It has also been brought out that the vaccinated individuals are perhaps as susceptible as the unvaccinated during the first 10 or 15 days following the last injection. The protection becomes effective only after the lapse of that period which undoubtedly is that required for the development of immunity in the body of the vaccinated individual.

In 1921 Peru suffered from the visitation of a tremendous yellow fever epidemic in which 15 000 cases of the disease were reported. Dr Joseph H. White assistant surgeon-general of the U.S. Public Health Service who witnessed the Peruvian campaign reports that in one instance 50 non immune soldiers 25 of whom had been vaccinated were stationed in the villages where the epidemic of yellow fever was at its height. Of the 25 non vaccinated soldiers 20 contracted the disease while none of the 25 vaccinated came down."

NOUGENT (Hideo) Researches on Yellow Fever. Comparative Aetiological, Pathological and Epidemiological Considerations. Prevention and Treatment.—Lancet 1922. June 17 pp 1185-1191

rhesus M cynomolgus and *M. speciosus*. The first two species were readily infected by the inoculation of blood from yellow fever patients, and *M. speciosus* by the inoculation of liver emulsion from a *rhesus* monkey dead from the disease. The course of the resulting infection and also the post-mortem appearances agree with those previously described [see HUDSON this *Bulletin* Vol. 25 p. 953]. The infection was not always fatal to the monkeys, and the author notes the curious feature that mild cases of yellow fever seem to be the most favourable for producing the infection in monkeys. Two monkeys inoculated with blood from such cases both succumbed to the infection, whilst three others inoculated with blood taken from a severe case which died before the third day did not become infected. [This may explain some of the earlier failures to transmit yellow fever to monkeys.]

Fifteen cases of yellow fever in man, and all the infected monkeys, were carefully examined for the presence of *Leptospira* and none found. Also serological tests, employing the Palmetras strain of *L. icteroides* and *L. icterohaemorrhagiae* gave negative results. Complement fixation tests using carbolized liver of infected monkeys as antigen, gave negative results. The Wassermann test was also negative. [The author's results indicate that the South American strain of yellow fever does not differ from the West African one as in both cases inoculation into susceptible monkeys produces identical symptoms.]

E. H.

THEILER (Max) & SELLARDS (Andrew Watson). The Immunological Relationship of Yellow Fever as it occurs in West Africa and in South America.—*Ann Trop Med & Parasit* 1928. Dec. 28. Vol. 22. No. 4. pp. 449-480. [11 refs.] [Harvard Med School, Boston, Mass.]

An experimental study proving the identity of the African and Brazilian strains of yellow fever. The authors used a West African strain of virus and serum collected from patients at Paratyba, Brazil about 3½ months after an attack. These sera had been stored since 1926 at 2° to 4° C. and had previously been tested against *Leptospira icteroides* see this *Bulletin* Vol. 25 p. 543.]

Two sets of experiments were made. In the first series the virus was inoculated subcutaneously and the convalescent serum intraperitoneally. In the second, they were mixed *in vitro* and inoculated subcutaneously. As a rule 2 cc. of serum was used and controlled by testing sera from other diseases. The authors state that monkeys frequently die of yellow fever without showing any distinct rise in temperature consequently this is not a certain method of detecting mild infections. In a preliminary experiment three control sera and one immune serum from Brazil were tested against the African virus. All three monkeys inoculated with control sera and virus died of yellow fever whilst the other remained healthy. Nine specimens of convalescent serum were then tested against virus, of low virulence as a result of being kept in the freezing room for some time. Of the nine animals receiving convalescent serum and virus two died and seven remained well. One monkey died on the 22nd day and the histological examination confirmed the diagnosis of yellow fever. The other died on the 26th day with doubtful symptoms. Of three controls, two died and one recovered after an attack of yellow fever. Seven of

the sera were retested in monkeys using fully virulent material. Four of these animals survived and three died on the seventh day. Two controls both died on the fourth day. Active immunity was found to be present one month after the injection of convalescent serum and virus of low virulence. One specimen of serum when injected without virus conferred passive immunity for one month. This same serum mixed with virus protected the animal but the passive immunity had disappeared at the end of one month. Three animals that survived the protection test of convalescent serum and virus of high virulence, were found to be actively immune two and a half months later whilst a fourth animal only injected with convalescent serum had lost its passive immunity and died of yellow fever six days after being inoculated. The authors results show that passive immunization against yellow fever in monkeys with human convalescent serum lasts for about one month. [The results of this valuable study should put an end to any further suggestions that yellow fever in West Africa is a different disease from that occurring in America.]

E. H.

PETTIT (Auguste) STEFANOPOULO (Georges) & FRASEY (Victor)
Pouvoirs préventif et curatif du sérum anti amaryllique. [The Protective and Curative Properties of Anti-Yellow Fever Serum.]—*C R Soc Biol* 1928, Oct. 19 Vol. 99 No 28, pp. 1114-1116. [1 ref.]

This paper is a continuation of a preceding one [this *Bulletin* Vol. 25 p 851] and gives the results of treating ten monkeys with anti yellow fever serum. Five were inoculated with the serum of a baboon and five with horse serum. In two experiments the serum was injected the day previous to a dose of virus. In the others the serum was administered respectively the same day as the virus the following day two days later and three days later the injections of serum being repeated for three or four days. None of these animals became infected and all resisted a second inoculation of virus made 14 days after the first one. Two monkeys were inoculated with the virus as controls and one died of yellow fever whilst the other recovered after a severe attack.

E. H.

KANEKO (Renjiro) Ein pathologisch anatomischer Beitrag zur Frage der Identität der *Leptospira scleroides* und der *Spirochaeta sclero-haemorrhagiae* [A Pathological Anatomical Study of the Question of the Identity of *Leptospira scleroides* and *Sp. sclero-haemorrhagiae*]—*Klin. Woch.* 1928 June 24 Vol. 7 No 28 p 1236 [8 refs.] [First Med Clinic Imperial Kyushu Univ. Fukuoka.]

The author examined sections of guinea-pigs supplied by NOGUCHI, which were supposed to be infected with yellow fever and showed the characteristic necrosis and fatty degeneration of the liver cells not found in cases of Weil's disease. To explain these results he supposes that NOGUCHI infected his guinea-pigs with a mixed infection of *Leptospira* and yellow fever.

[All subsequent observers have failed to infect guinea-pigs with either African or American strains of yellow fever.]

E. H.

HOFFMANN (W. H.) & JAHNEL (F.) Nachforschungen nach der Gelbber-spirochäte *Noguchia* in Organen von an afrikanischem Gelbfieber verstorbenen Menschen. [A Search for *Noguchia* Yellow Fever Spirochaeta in the Organs of African Yellow Fever Cases.]—*Munch. Med. Woch.* 1928 Dec 14 Vol. 75 No 50 pp 2131-2132 [Finkay Inst. Havana, Cuba & Kaiser Wilhelm Inst., Munich]

An examination of the organs of yellow fever patients from West Africa for *Leptospira* gave entirely negative results.

E. H.

DA CUNHA (A. Marques) & MUNIZ (Julio) La fièvre jaune et *Leptospira icteroides* (Yellow Fever and *Leptospira icteroides*)—*C. R. Soc. Biol.* 1928 Nov 30 Vol. 89 No 34 pp. 1656-1657 [Oswaldo Cruz Inst. Rio de Janeiro Brazil.]

Employing NOGUCHI's technique, the authors examined the blood of 13 yellow fever patients at Rio de Janeiro taken at different stages in the disease. In every instance cultures, inoculation into guinea-pigs and dark ground examination of blood and infected tissues gave uniformly negative results as regards *Leptospira*.

E. H.

PETIT (Auguste) & STEFANOPOULO (Georges) Le virus de la fièvre jaune. [The Virus of Yellow Fever]—*Bull. Acad. Méd.* 1928. Oct. 2 Year 92. 3rd Ser. Vol. 100 No 32 pp 821-830 [40 refs.]

The first part of this article contains a summary of the evidence proving that yellow fever is not a spirochaetal disease but is caused by a filtrable virus. The second part is an account of recent work with the virus.

E. H.

CHAGAS (Carlos) Sur la récente éruption de la fièvre jaune à Rio de Janeiro [The Recent Outbreak of Yellow Fever at Rio de Janeiro.]—*Bull. Office Internat. d'Hyg. Publique* 1928 Oct. Vol. 20 No. 10 pp 1577-1583. With 2 graphs

A useful account of the yellow fever epidemic in Rio de Janeiro during 1928 and the measures adopted in combating the disease.

E. H.

BUNAU VANILLA (P.) La vermunisation dans la lutte contre la fièvre jaune. [Water Chlorination in the Fight against Yellow Fever.]—*C. R. Acad. Sci.* 1928. Nov 28 Vol. 187 No 22. pp 1005-1006

A suggestion that the chlorination of tap water by killing vegetable growth and so making the water unfavourable for the breeding of mosquitoes, will help in the suppression of yellow fever

E. H.

ARAGÃO (Henrique Beaurepaire) Recherches sur la fièvre jaune. [Researches on Yellow Fever]—*Bull. Office Internat. d'Hyg. Publique* 1928 Oct. Vol. 20 No 10 pp 1584-1590

A summary of the author's work, previously published elsewhere [see above]

E. H.

- BARROSO (Sebastião) A febre amarella no peste africano.—*Brasil-Médico* 1928. Sept. 15 Vol. 42 No 37 pp. 1045-1047
- BARROSO (Sebastião) Febre amarella. Pontos controversos.—*Brasil-Médico* 1928. Nov 5 Vol. 42 No 44 pp 1227-1229
- BARROSO (Sebastião) Febre amarella. Pontos controversos. II.—*Brasil-Médico* 1928. Nov 10 Vol. 42 No 45 pp 1272-1274
- CARBONELL (Manuel V) El problema de la fiebre amarilla.—*Semana Méd* 1928. Sept. 13 Vol. 35 No. 37 (1809) pp 705-708.
- DA FONSECA (Olympio) Febre amarella e mosquito.—*Ciencia Méd* 1928 Nov Vol. 6 No. 11 pp 537-542. [1 ref.]
- FRAGA (Clementino) O surto de febre amarella no Rio de Janeiro.—*Rev Méd Ciênc do Brasil* 1928. Aug Vol. 36 No 8 pp 344-349
- HOFFMANN (W H) The Diagnosis of Endemic Yellow Fever.—*Amer J Trop Med* 1928 Nov Vol. 8 No 6 pp 563-568 With 1 fig [Finlay Inst. Havana Cuba.]
- HOFFMANN (W H) La fièvre jaune africaine.—*Bull Med. de Katanga* 1928 Vol. 5 No. 1/2, pp 7-15
- LEGER (Marcel) Etat actuel de nos connaissances sur l'épidémiologie de la fièvre jaune.—*Jl Méd de Bordeaux* 1928 Dec. 10 Vol. 105 No 24 pp 970-982.
- MELLO (A da Silva) O problema da immunnidade na febre amarella.—*Brasil-Médico* 1928. Sept 29 Vol. 42. No 39 pp 1079-1087
- MELLO (A. da Silva) Questões de epidemiologia no actual surto de febre amarella.—*Brasil-Médico* 1928 Oct. 13 Vol. 42. No. 41 pp 1137-1142.
- MELLO (A. da Silva) Febre amarella. Pontos controversos.—*Brasil-Médico* 1928. Dec. 1 Vol. 42. No 48 pp 1339-1344
- PITTALUGA (G) El problema de la fiebre amarilla.—*Medicina Paises Calidos* Madrid. 1928. Jan. Vol 1 No 1 pp 5-25 With 2 text figs [42 refs.]
- DE REZENDE (Cassio) Febre amarella.—Pontos controversos.—*Brasil-Médico* 1928. Dec. 15 Vol. 42. No. 50 pp. 1395-1397
- SANTOS (Juvenal) Notas em torno de alguns casos de febre amarella.—*Brasil-Médico* 1928. Oct. 20 Vol. 42 No. 42. pp 1187-1190

KALA AZAR.

SHORTT (H. E.) CRAIGHEAD (A. C.) & SWAMINATH (C. S.) A Brief Résumé of Recent Kala-Azar Research with Special Reference to India.—*Indian Jl Med Res.* 1928 July Vol. 16, No. 1 pp. 220-237 With 1 map & 1 plate. '51 refs.]

The authors review the present position of kala azar in India and summarize the investigations which have been conducted during the past few years with a view to discovery of the method of transmission and the most efficient method of treating the disease. The distribution is shown on a map which indicates two large endemic areas, the one comprising practically the whole of Bihar Assam, Bengal and Orissa, and the other the eastern portion of the Madras Presidency south of a point a little north of Madras City. Probable present extensions of the endemic areas are also shown. These indicate involvement of the whole of the east coast of India, and the southern portion of Orissa, areas on the west coast with Trichur Calcutt, Mangalore and Bombay as centres and another area in the Punjab around Sunawar. There appears also to be a further extension of the Bihar focus in a westerly direction beyond Lucknow and Allahabad and of that of Bengal to the southern coastal district. It is noted that in India kala azar is essentially a cyclical disease, a series of about ten years epidemic prevalence being succeeded usually by a longer interval of fifteen to twenty years of comparative quiescence during which the epidemic becomes an endemic focus in which scattered cases occur in insufficient numbers to affect the vital statistics. Another point is that when the disease reaches an area previously unaffected it seems to assume a specially virulent form. A third factor is that when an epidemic commences in a hitherto unaffected area or when the disease assumes epidemic form in an old endemic area, it does not do so at one particular spot, but in more than one the different spots often being far distant from one another. This phenomenon implies some far reaching factor in the causation of epidemics. So far as is known though the disease has been present in Madras for a long time it has not appeared in epidemic form as in Assam. This may be due to the fact that in Assam the prevalence of *Phlebotomus* shows very great seasonal variations, whereas in Madras this is much less marked.

As regards the investigations which have been carried out, dermal leishmanoid is mentioned. It is noted that CHRISTOPHERS in his report on kala azar published in 1904 under the headings of mottling of the skin and papular eruption described this condition. Work on the parasite of kala azar and the method of its transmission has centred round *Phlebotomus argentipes* and the development which takes place in this insect. It is again noted that feeding experiments have failed to effect transmission. On white mice 3,590 flies on Chinese hamsters 2,325 flies, and on human volunteers 1,247 flies at the supposedly infective stage have been fed without producing infection. Under the heading of treatment special emphasis is laid on this as a public health measure. The authors believe that, taking into consideration the prevalence of the disease in Assam during 1917 to 1927 were it not for the wide-spread sterilization of the peripheral blood due to treatment the outbreak would have been more disastrous than that of 1891.

to 1901. The numbers of cases treated during 1924, 1925 and 1926 were 48,770, 60,940 and 46,231 figures which mean that in 1925 there would have been 60,940 more sources of infection than there actually were. Present indications show that in another year or two the disease in Assam will have regained the character prevalent in the inter-epidemic period when it exerts no influence on the mortality and health returns. There is a danger that then interest in the disease will wane but it cannot be too strongly impressed on the governments concerned that this will be the time to prosecute with greatest vigour the eradication of all sources of future danger.

C. M. Wenyon.

HINDLE (Edward) Further Observations on Chinese Kala Azar —
Proc. Roy. Soc. 1928, Nov. 1, Ser. B, Vol. 103, No. B 727
pp. 599-619. With 4 figs. on 2 plates. [5 refs.]

The experiments described in this paper are a continuation of those previously recorded (this *Bulletin* Vol. 24, p. 639). The statement previously made regarding the possibility of infecting the sandflies *P. major* var. *chinensis* and *P. sergenti* is confirmed. Both became infected after feeding on human beings suffering from kala azar or on experimentally infected hamsters but whereas in the latter the flagellates were limited to the stomach and disappeared with the completion of digestion of the blood meal in the former the stomach phase persisted while flagellates in a certain proportion of sandflies passed forwards through the oesophagus multiplied in the pharynx and extended along the proboscis. The results of feeding sandflies on four patients are described. Two of these led to infection of a certain number of flies and two did not. In previous work and that recorded in this paper a total of 14 patients were used for infecting sandflies but only 4 of these proved infective to the insects. Of the flies actually fed on these four cases only 5 per cent showed any development of flagellates. It is concluded that the Chinese strain of leishmania is less infective to *Phlebotomus* than the Indian strain and it is suggested that this difference is correlated with the greater chronicity of the disease in China. In feeding experiments with infected hamsters it was noted that one particular animal, which was subsequently found to have a heavy skin infection, led to the infection of practically every one of 100 *P. major* var. *chinensis* and 72 *P. sergenti* which fed on it. Furthermore the intraperitoneal injection of flagellates from both these sandflies produced infection in hamsters. The sections of the skin of the hamster on which the flies were fed showed large numbers of clasmatoocytes filled with parasites. The experience gained with this animal and others indicated a correlation between skin infection and infectivity to sandflies. It would appear that in most cases in which sandflies become infected the parasites have been taken up from the skin. The possibility of infecting sandflies by feeding them on hamsters may depend on another factor, namely the infectivity of the strain of parasite. It was noted that the hamsters inoculated from five well advanced cases of kala azar did not all give the same result as regards the percentage of sandflies which became infected. In one case though there was a high degree of virulence to the hamster of the strain inoculated there was an almost complete lack of infectivity to the sandfly. It is thought that this factor may influence the spread of the

disease in nature. Nothing, however, is said about the degree of skin infection in these hamsters—a factor which the author has already shown to be of importance.

A number of feeding experiments with known infected *P. major* var *chinensis* did not lead to infection of hamsters. Intraperitoneal injection of flagellates from both sandflies produced infection, but intracutaneous injections did not. Of 124 hamsters inoculated intraperitoneally with the whole contents of varying numbers of infected *P. major* var *chinensis* 7 became infected, while of 41 similarly inoculated with the contents of infected *P. sergenti* 2 became infected.

It appears probable from the fact that kala azar occurs in infants of such an age that they could not possibly have been exposed to the bites of sandflies, that congenital transmission occurs. In one case an infant four months old was found to be suffering from the disease which was stated by the mother to have been noticed on account of the increase in size of the spleen two months before. The child had been born after the close of the sandfly season, and though there was no evidence that the mother was infected it is concluded that the infant had probably been infected before birth. The condition of enlargement of the spleen in endemic areas is well recognized by the inhabitants, who term it *Nai Pi* or milk spleen. Cases with this condition are known to have recovered without treatment so that it would appear that not only is the disease transmitted congenitally, but numbers of cases recover. Spontaneous recovery of hamsters experimentally infected may also occur.

C. M. W.

WENTON (C. M.) *Kala-Azar and Oriental Sore: the Problem of Transmission*.—*Brit. Med. J.* 1928, Sept. 29, pp. 558-562.

This paper is a review of the present position of the transmission problems of kala azar and oriental sore in the light of recent discoveries. As flagellates of the leptomonas type are essentially parasites of insects there is every reason to suppose that the parasites of those diseases which assume the leptomonas form in cultures have some insect host. The flagellates peculiar to insects lead to infection of the hind gut and pass from one host to another by small encysted forms voided in the faeces. It might have been expected that the leishmania in the insect host would similarly develop in the hind gut, but in sandflies of the genus *Phlebotomus* which are the only insects in which a satisfactory development of leishmania has been found to occur the development is in the stomach with a tendency for the leptomonads to pass forwards along the proboscis. If the sandfly is the original insect host of the parasites it has to be assumed that a development in the hind gut has been altered to one in the anterior part of the alimentary tract. It is possible, however, that the sandfly is not the original insect host and that flagellates from it having established themselves as leishmania in man have led to a secondary infection of the sandfly. It is suggested that a similar explanation may hold in connexion with the anterior development of pathogenic trypanosomes in tsetse flies, since in what appear to be the more primitive trypanosomes development in the invertebrate is also in the hind gut. It is noted that though up to the present all attempts to transmit kala azar or oriental sore by the bite of infected sandflies have failed, it is known that flagellates escape from the proboscis of such flies when they feed and that the flagellates

removed from flies by dissection are capable of producing infection when injected into animals or human beings. If all attempts at transmission by the bite fail then attention should be paid to the possibility of infection occurring through crushing of infected sandflies on the skin and the conveyance of virus to the mouth or conjunctiva. Such methods of infection occur in the case of relapsing fever and lice. As regards the possibility that the leishmania passes directly from man to man without the intervention of an insect host though it is known that infection by the mouth can occur in this manner in experimental animals the extraordinary development of leptomonas in cultures and in the sandfly would be quite unintelligible if such a method of direct transmission occurred. There seems every reason to suppose that the leptomonas stage must form part of the life cycle of leishmania and if so it almost certainly occurs in some insect for the leptomonas are incapable of developing or surviving in water or outside the body of an insect host unless as the small encysted forms which infected insects void in their faeces. Such encysted forms do not appear in sandflies infected with leishmania, so that at present it seems that the flagellates in the sandfly produce infection though their method of gaining access to the body of man in sufficient quantity to lead to infection is not yet clear

C. M. W.

INDIAN MEDICAL GAZETTE. 1928. Aug Vol. 63. No 8. pp. 483-490 — **Report on the Kala-Azar Survey in Patna City August-November 1923.** By Lieut.-Col. William C. Ross I.M.S. Director of Public Health Bihar and Orissa Patna Superintendent Government Printing Bihar and Orissa, 1928

The writer (L. E. N.) criticizes the Report of Col. W. C. Ross on the kala azar survey which he made in Patna City and which was noted in this *Bulletin* Vol. 25 p. 856. He points out that it is unfortunate that Ross who had made his survey in 1923 (a fact not noted by the reviewer) and had come to the conclusion that the disease was not transmitted by biting insects did not publish his report till 1928 though he must have been aware that all the energies of the Kala Azar Commission in India were concentrated on proving that some biting insect was responsible for its spread. Owing to the fact that no account is taken of cases of the disease which did not apply for treatment or were treated elsewhere than at the hospital, the computed incidence of 6.5 per thousand is probably an under estimate rather than an over estimate as suggested. Furthermore it is stated that though the cases seen were mostly in males it is probable that actually the two sexes are affected equally. If this be so then it is evident that calculations based on the number of cases seen must be erroneous. If allowance be made for this by addition to the totals to bring the cases amongst the two sexes to the same level then the figure becomes 10 in place of 6.5 per thousand. The Report emphasizes the rarity of multiple infections in households in Patna City. This is contrary to the experience in Calcutta and is possibly explained by the fact that the survey covered a very short period only—August to November 1923. There can be no doubt that there is a slight preponderance of the disease amongst Mohammedans as compared with Hindus. Here again Ross makes no allowance for the sex question. If cases in males alone are considered the figures are not 10.6 and 5.2 per thousand, but 3.7 and

2.9 a not very striking difference when it is realized that only 113 cases were involved. It is assumed that the only difference between these classes is in eating habits but the writer notes that there are many other possible explanations—for instance the surroundings of one class may be more congenial to some particular biting insect than those of the other. Commenting on the age incidence the Report states in reference to recorded observations, "all of them have made a point of the extraordinary prevalence of the disease amongst children and adolescents" and concludes that from the Patna figures "it at once appears that kala azar is not so predominantly a disease of children as has previously been thought. The writer notes that the percentage of total cases in each age group corrected according to distribution of general population calculated from the figures in the Report, is under 10 3.6 10-20 37.0 20-30 21.8 30-40 6.1 over 40 2.9 while the figures (uncorrected for the Assam dispensary published by the writer in his book in 1927 for the same age periods are 30.76, 37.8, 18.6 9 and 3.8. These do not appear to be very strikingly different from those obtained for the Report. As regards the more frequent occurrence of multiple infection in dilapidated masonry houses, the writer and the Report are in agreement. It is somewhat remarkable that the incidence of the disease in houses with satisfactory privies was 4.64 per hundred houses 2.04 in houses with unsatisfactory privies, and only 1.52 in houses without privies. This appears anomalous, for if the privy had any relation to the disease it might be expected that the unsatisfactory privy would conduce to a greater spread of the disease than the satisfactory one. As all the houses with privies were masonry houses it would seem that the character of the building and not the privy was the important factor.

The writer concludes by stating that Col. Ross has shown that the epidemiology of kala azar in Patna is similar to that of the disease in other parts of India, especially Bengal but that he cannot follow him when he assumes that all the observations he has made point to the fact that kala azar is not transmitted by biting insects, but that infection takes place by way of the intestinal tract.

C. M. W.

CASAS (L.), DE BUEN (S.) & RODRIGUEZ (R.). Algunas consideraciones sobre setenta y tres casos de leishmaniasis visceral. (Seventy Three Cases of Kala Azar.)—*Medicina Pátrica Calidos*. Madrid. 1928. Nov. Vol. 1 No. 8. pp. 515-522.

The paper gives an account of 73 cases of kala azar treated at the anti-malaria station of Navalnoral de la Mata, Caceres, Spain. The majority of the cases were in young children one to three years of age, while from the point of view of symptomatology the disease was of the usual type. The cases were treated with tartar emetic or one or other of a series of organic antimony derivatives. Of 50 cases in which treatment was completed 6 were given tartar emetic with two deaths, 18 stibenyl with 8 deaths 15 Bayer 211 212, etc. with 2 deaths, and 2 relapses 7 antimonan with 2 deaths 3 estibosan and 1 Bayer 883 with no deaths. The highest death rate 33.3 per cent., was in children under one year of age. It was 28.8 per cent. in those from one to three years of age and 22.2 per cent. in those from four to seven.

C. M. W.

ORTEGA CORROCHANO (DAVID) Cien casos de leishmaniosis visceral (kala azar). Estudio clinico y terapeutico [One Hundred Cases of Kala Azar].—*Medicina Paises Calidos* Madrid. 1928 Nov. Vol. 1 No. 6. pp. 507-514

Since the establishment of the anti malaria dispensary at Jefe in the South of Spain in July, 1928 there have been diagnosed by spleen puncture about 100 cases of infantile kala azar. In this paper are given mostly in a large table, certain details of 102 cases. Treatment was carried out by various antimony compounds and the results which are given of 94 cases show that 11 were lost sight of, 30 died and 53 were cured.

C. M. W.

COVISA (J. S.) & GONZALEZ MEDINA (R.) Leishmaniosis visceral y cutaneo-mucosa. [Case of Visceral and Mucocutaneous Leishmaniasis].—*Medicina Paises Calidos* Madrid. 1928 Nov. Vol. 1 No. 6 pp. 551-557 With 4 text figs.

The paper describes a case of kala azar in a boy in Spain fourteen years of age. The special feature of the case was a severe ulceration of the upper lip, both the skin and mucosa being involved. Puncture of the spleen revealed numerous leishmania while examination of a portion of the ulcerated area showed ovoid bodies which had the appearance of parasites. It is concluded that this is an instance of muco-cutaneous leishmaniasis in a case of kala azar. [The evidence that the lip lesion contained actual leishmania is unsatisfactory, the case having the appearance of one of cancerum oris, a not infrequent complication of kala azar.] The case responded to appropriate treatment with tartar emetic.

C. M. W.

PATANÈ (Carmelo) Il posto attuale della Cirenaica nell'epidemiologia delle leishmaniosi nel Nord Africa. [Distribution of Leishmaniasis in Cirenaica compared with Other Parts of North Africa].—*Arch. Ital. Sci. Med. Colon* 1928 Feb. Vol. 9 No. 2. pp. 69-83 With 1 folding map. [7 refs.]

The author discusses the distribution of leishmania infections on the north coast of Africa. Of the various districts—Morocco, Algeria, Tunisia, Tripolitania, Cirenaica and Egypt—Cirenaica appears to be the least affected. During a long experience of the country and a careful search there have occurred only single cases of kala azar, canine kala azar and oriental sore. The immunity from these diseases appears to be correlated with a very low sandfly density. As regards kala azar only 93 cases have been recorded from the whole of North Africa. In Tunis with 172,000 inhabitants 32 cases were noted between 1905 and 1927. On the other hand in Catania with a population of 271,000 there were registered from 1909 to 1926 as many as 681 deaths from the disease while at the Clinica Pediatrica between 1910 and 1925 there were seen 1,424 cases of which 1,164 were in children from the city itself. Though of great interest in North Africa it is evident that kala azar is of less importance than in other parts of the Mediterranean as for instance Sicily.

C. M. W.

GIRAUD (Paul) & MASSOT (Marc) Le kala-azar infantile en France. Nouvelles considérations épidémiologiques et thérapeutiques. [Infantile Kala Azar in France. Epidemiology and Therapeutics.]—*Arch. Méd. des Enfants*. 1927 Sept. Vol. 30 No. 9 pp. 505-514 [6 refs.]

In an earlier publication (*Arch. Méd. des Enfants* Apr., 1926) all the cases of kala azar which had been reported in France up to December 1925 were reviewed by the authors. Since then ten further cases of the disease in children have come to their notice. One of these was observed in Toulon in 1923 the others were in children who had never left Marseilles or its immediate surroundings. The ten new cases bring the total of cases observed in France to 43 of which 34 were from the Marseilles district. The disease has shown no sign of increasing, for the figures for the four years 1923-1926 are 8 9 9 8. Cases have been recorded from Marseilles, Cassis, Toulon and Nice and one diagnosed clinically only from Mentone. One such case of Corsican origin was noted by the authors. It is noteworthy that there are no records of the disease from between Marseilles and Spain where it is common. It seems probable that more careful search will reveal the disease in this district. In the Mareilles region the cases are always sporadic and mostly arise in the districts around the town. From the observations of ORIOU and PRINGALT it is known that canine kala azar is fairly common in Marseilles, while ROSIER has noted its frequency in Grasse. There does not appear however to be any reason to suspect dogs as the source of human infection. As regards the vector the authors note that in one case at least fleas and bugs could be excluded, though there was definite exposure to mosquitoes and sandflies.

C. M. W.

SEVROPOULOS (N. J.) Betrachtungen und Ergebnisse der Kala-Azar-Erkrankungen des kindlichen Alters. (Unter Zugrundelegung eines Materials von 96 Fällen) [Kala Azar in Ninety Six Children.]—*Med. Klin.* 1928. Nov. 30. Vol. 24 No. 48 (1251) pp. 1863-1868. With 1 chart in text. [Children's Clinic, Univ. Athens]

The author gives his experience with 96 cases of infantile kala azar seen at the children's clinic of the University of Athens. Of the 96 cases, 48 were in the first year of life, 42 in the second and 6 in the third. The youngest was in a child 6 months old. Treatment was carried out with a brand of tartar emetic sold under the name of stibyl. Injections were usually made in the jugular vein on alternate days, the dose being 0.01 gram for each year of life. In cases which recovered the number of injections varied from 20 to 50. Of the 96 cases only 57 were followed completely and of these 72 per cent. recovered. It is noted that an increase in the number of leucocytes is an indication that treatment is having the desired effect. The presence or absence of parasites in the spleen after treatment has been completed does not appear to bear any relation to ultimate recovery.

C. M. W.

NAPIER (L. Everard) A Spleen-Puncture Syringe.—*Indian J. Med. Res.* 1928 July Vol. 16. No. 1 pp. 149-152. With 3 figs. on 1 plate [1 ref.]

In performing spleen puncture for the diagnosis of kala azar it is necessary for the spleen to be immobilized. This requires two persons,

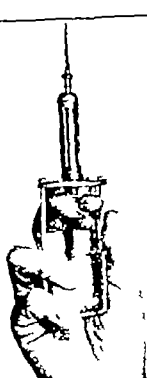


Fig. 1

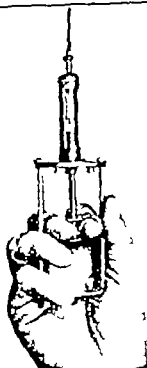


Fig. 2.

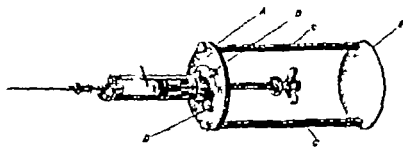


Fig. 3.

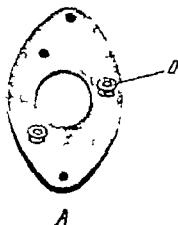
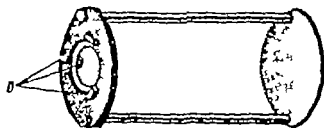


Fig. 3

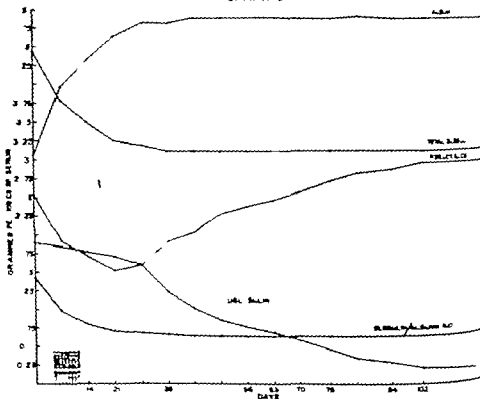


A spleen puncture syringe attachment to enable a syringe to be operated by one hand. A and B are oval metal plates (5 cm. by 3.5 cm.) held parallel by two metal tie rods C (9.8 cm. long). Plate A has a recessed hole in which the collar of a 5 cc Roux syringe is kept in place by three locking bolts D.

[Reproduced from the *Indian Journal of Medical Research*]

of the englobulin. At a later stage of the treatment the pseudoglobulin begins to rise again so that its curve crosses that of the englobulin a second time. This intersection of the curves represents the point at which the globulin and albumin first stabilize themselves, or in other words the point at which the globulin-albumin ratio first becomes normal. From this point onward, the pseudoglobulin curve rises steadily till it nearly touches that of the total globulin, the englobulin falling to the normal of 0.16 gm. The form of these curves is very characteristic and is shown with minor variations in every case the serum of which has been examined. They appear to express

GRAPH G



A typical protein graph in Kala Azar
(Reproduced from the *Indian Journal of Medical Research*.)

some deep-seated change which occurs during treatment while from their regular appearance it would seem likely that they may be used as a serological standard for the control of treatment of kala azar as the Wassermann reaction is used for the control of the treatment of syphilis.

It is pointed out that a special englobulin appears to be present in kala azar. This substance or substances precipitated with it are the fundamental cause of the formal leuco-gel reaction in kala azar. It may be possible to regard the decrease in englobulin which occurs as a result of treatment as an expression of the fading formal leuco-gel reaction.

C. M. V

HODGSON (E. C.) SEN (Ram Taran) & DAS (C.) Studies of the Effects of Antimony Salts. No. 2. The Effect of Aminostiburea on Cases of Kala Azar.—*Indian Jl Med Res* 1928. July Vol. 16. No. 1 pp. 31-33

The paper describes the treatment of eighteen cases of kala azar with aminostiburea, manufactured by the Union Drug Co. of Calcutta. In all cases a commencing intravenous dose of 0.05 gm. was given and this was followed by doses every second day in increasing amounts till 0.2 or 0.3 gm. doses were reached. The ages of seventeen of the patients varied from 9 to 36 years—one was 62 years of age. The amount of drug administered to each case varied from 1.5 gm. to 6 gm. and the duration of treatment from 17 to 55 days. In all cases a cure was obtained. It is concluded that the drug is a valuable addition to those already discovered.

C. M. W.

NAPIER (L. Everard) The Pentavalent Compounds of Antimony in the Treatment of Kala-Azar Part III. Aminostiburea; an Analysis of the Treatment in 52 cases.—*Indian Jl Med Res* 1928. July Vol. 16 No. 1 pp. 141-147

The author describes the treatment of 52 consecutive cases of kala azar with aminostiburea which has a low relative toxicity to white mice and is well tolerated by man in comparatively large doses. Of the cases 48 were discharged as cured, 2 died during treatment, and 2 failed to respond to the drug. Of the 48 described as cured, 38 were known to be in good health six months later. 8 were not traced and 2 had died. The mean of the total dose given to the 38 patients was 2.55 gm. To 30 of these who had had no previous treatment the mean total dose was 2.23 gm. It is calculated that in a mixed population a total dosage of 2.3 gm. per patient or 3.31 gm. per 100 pounds of body weight should produce a cure rate of not less than 90.9 per cent.

C. M. W.

NAPIER (L. Everard) & MULLICK (M. N.) The Intensive Treatment of Kala-Azar by Neo-Stibosan.—*Indian Med. Gaz.* 1928. Aug Vol. 63 No. 8 pp. 445-450 With 1 chart. [3 refs.]

As neo-stibosan (No. 693) proved to be a pentavalent antimony compound of such low toxicity and high curative value that 175 cases of kala azar were treated with only three deaths the authors made observations on the possibility of reducing the course of treatment to a minimum. To 28 unselected cases daily doses were given for eight days the first dose being 0.2 gm. and the others 0.3 gm. The result was so satisfactory that the authors conclude that with this short course a high percentage of cures can be expected. The drug can be given with safety intravenously in 25 per cent. solution, though in most instances a 5 per cent. solution was employed. Furthermore the drug is equally efficacious when given intramuscularly 0.3 gm. in 25 per cent. solution being isotonic with the tissues and causing less pain than a similarly given injection of 0.063 gm. (1 grain) of emetine.

C. M. W.

HODGSON (E. C.) & SEX (Ram Taran) Experiments with *Vibrio* *Pedunculata* in the Treatment of Kala-Azar—*Indian J. Med. Res.* 1928. July Vol. 16 No. 1 pp. 35-37 [1 ref.]

The plant in question is common in the forests of Assam, Bihar and Orissa, and has a local reputation for curing many diseases, including malaria and kala azar. It was decided to test its action in the latter disease. Treatment was undertaken with decoction (1 to 4 oz.) or infusion (1 oz.) in each case given orally three or four times a day. In the two cases investigated there was improvement in the general condition but no cure resulted the parasites in the spleen increasing steadily in numbers. The cases were subsequently cured with urea stibamine.

C. M. W.

SHORTT (H. E.), CRAIGHEAD (A. C.), SMITH (R. O. A.) & SWAMINATHAN (C. S.) Further Transmission Experiments in Kala-Azar with *Phlebotomus argentipes*—*Indian J. Med. Res.* 1928. Oct. Vol. 16 No. 2 pp. 263-270 4 refs.

In a previous paper (this *Bulletin* Vol. 24 p. 636) Shortt, Barrard and Craighead described attempts to transmit kala azar to white mice and hamsters by the bites of infected *Phlebotomus argentipes*. These experiments had certain limitations. Firstly the number of presumably infective flies which fed on each animal was relatively small. Secondly a larger number of the animals was subjected to the second feed of the fly only though it was considered that the third or subsequent feed was most probably the transmitting one. and thirdly human beings had not been used. In the series of experiments detailed in the present paper an attempt has been made to meet these objections by employing human volunteers and by subjecting each of them and the animals used to the bites of large numbers of infected flies. The animals used were white mice and Chinese hamsters and the volunteers were four individuals who had never lived in a kala azar area, who were brought as rapidly as possible to the laboratory on each occasion on which feeding took place and who were taken back immediately to the non-infected area. The numbers of feeds by flies at supposedly the infective stage on the volunteers were 67, 443, 336 and 364 respectively. By dissection of a certain number of these flies after feeding and noting the proportion of those actually infected the probable numbers of feeds by infected flies were estimated as 23, 154, 116 and 137. After a lapse of 20 months there had been no evidence of infection. Similar experiments were made with 22 white mice and 15 hamsters. The feeds of supposedly infected flies on each individual varied from 1 to 803 numbers which were reduced by control dissection to 0 to 283. In the case of the hamsters, the corresponding numbers were 22 and 485 reduced to 7 to 168. In the cases in which the experiment was of short duration and the number of feeds small the premature death of the animal or its sickness and consequent sacrifice was the cause. The duration of the experiments in the case of the animals varied from a maximum of 470 days to a minimum of 43 days. Though the intensity of exposure to infection was much greater than could ever obtain in nature in Assam the results were entirely negative.

C. M. W.

- SHORTT (H. E.), CRAIGHEAD (A. C.), SMITH (R. O. A.) & SWAMINATH (C. S.) Infection of Hamsters (*Cricetus griseus*) with *Leishmania donovani* by the Oral and Conjunctival Routes.—*Indian J. Med. Res.* 1928. Oct. Vol. 16. No. 2 pp. 271-274 [10 refs.]

The experiments recorded refer to two Chinese hamsters. An emulsion of liver and spleen of an infected hamster was made. By means of a pipette about 0.2 cc. of the emulsion was allowed to drop into the mouth of one animal and a few drops into the eye of the other. Both animals remained in good condition and were killed at the end of the year (April 16th, 1927–April 14th 1928). In both animals the spleen was enlarged to four times the normal size. Parasites were found in the spleen, liver and bone marrow.

C. M. W.

- BUROWA (L.) [The Rieckenberg's Reaction of the Leishmaniasis].—*Pensée Méd. d'Usbekistane* Tashkent. 1928. Oct. No. 1 pp. 20-28. [7 refs.] [In Russian. English summary p. 100.]

The sera of mice inoculated with strains of leishmania were tested against cultures for the Rieckenberg reaction. It was noted that the serum of healthy mice may show this phenomenon with *L. tropica* but that its intensity is increased by inoculating them with strains of this organism. By the test, however, it was possible to differentiate between *L. donovani* and *L. tropica*. The specificity of this test seems doubtful in view of the action of the serum of healthy mice.

C. M. W.

- CHODUKIN (N. I.) & SCHEWTSCHENKO (F. I.) [Die Hauterscheinungen bei der Leishmaniose der Hunde.] [The Skin Lesions in Canine Leishmaniasis].—*Pensée Méd. d'Usbekistane* Tashkent. 1928. Oct. No. 1 pp. 29-38. [14 refs.] [In Russian. German summary p. 100.]

The authors from an experience derived from post mortems on 4,000 dogs in Tashkent have come to the conclusion that cutaneous leishmaniasis as distinct from kala azar does not exist in these animals. It is merely a symptom of a generalized infection. They have seen dogs in which the skin lesions were the prominent feature while the generalized infection produced no noticeable symptoms. In other cases there were skin lesions associated with scanty parasites only in one particular organ—spleen or bone marrow. In a large percentage of apparently healthy dogs leishmania were found in the sebaceous glands or hair follicles. They compare the cutaneous lesions of dogs with the infection of the skin as described by HU and CASH in hamsters inoculated with the parasite of kala azar and with the dermal leishmanoid first recorded by BRAMACHARI in human cases of kala azar in India.

The authors believe that the canine parasite is not a distinct species *Leishmania canis* but is identical with *L. donovani*. This conclusion is supported by serological tests.

C. M. W.

CHODURINE (N. J.) & SOFFIIEFF (M. S.) [Sur la question d'identité de la *L. donovani* et *L. canis*.] [Question of Identity of *L. donovani* and *L. canis*.]—*Pensée Méd. d'Usbekistane*. Tashkent. 1928. Oct. No. 1 pp. 5-19 5 refs.] [In Russian. French summary p. 89.]

With the serum of immunized mice, guineapigs and rabbits, the authors have carried out a series of serological tests with strains of leishmania. As regards the Ræckenberg or adhesion phenomenon, no difference could be detected between cultures of *L. tropica*, *L. donovani*, *L. canis* and the cutaneous form of *L. canis*. By adding immune serum to cultures it was found that an anti-donovani serum lysed *L. donovani* and both the visceral and cutaneous *L. canis* but not *L. tropica*. Conversely an anti-tropica serum lysed the homologous *L. tropica* but not the others. Agglutination and absorption tests gave similar results. The conclusion is that *L. donovani* and *L. canis* are identical but distinct from *L. tropica*. The cutaneous strain of *L. canis* is related to *L. canis* but the question of identity is still open to dispute.

C. M. W.

KRONKIN (N. I.) [Kala-Azar in Tashkent in Connection with the Epidemiology of Leishmaniasis in Dogs].—*C.R. Acad. Sci. U.R.S.S.* Leningrad. 1928. No. 13. pp. 246-250. [In Russian. Summarized in *Rev. Applied Entom.* 1929. Jan. Vol. 17. Ser. B. Pt. 1. pp. 9-10.]

Observations on canine and infantile kala azar in Samarkand showed that these diseases were most prevalent in the spring, especially in May. As regards sandflies the following species were encountered: *Phlebotomus papatasi*, *P. perniciosus*, *P. sergenti*, *P. l.*, *P. major*, *P. muscivorus* and two varieties of the last. About 600 sandflies were fed on the sores of infected dogs. Of those which survived 28 showed on dissection infection with berpetomonada. They were first noted on the fourth day after the feed, were most commonly found on the sixth day and were seen up to the tenth day. No sandflies were found naturally infected. The low percentage of infections obtained is explained by the fact that the sandflies used included *P. sergenti* which the author erroneously believes previous writers have found to be immune to infection with *Leishmania donovani*.

C. M. W.

ADLER (S.) & THEODOR (O.). Infection of *Phlebotomus sergenti* with *Leishmania tropica*. [Correspondence].—*Nature*. 1928. Aug. 25. Vol. 122. No. 3069. p. 278.

Working with *Phlebotomus sergenti* in Baghdad the authors have found that the flies can be infected by feeding them on cultures of *Leishmania tropica* exactly as in the case of *P. papatasi*. Later in Mosul, 17 laboratory bred *P. sergenti* were fed on a case of oriental sore, and of these 11 became infected. Two wild female *P. sergenti* out of a total of 683 dissected, were found naturally infected in the cardia and stomach. Material from one of these was inoculated into the skin of a volunteer who up to the date of writing had shown no sign of infection. It appears probable that *P. sergenti* is a vector of cutaneous leishmaniasis. A survey of its distribution in Baghdad suggests that it is the main carrier in some districts. In experiments subsequently carried

out in Jerusalem it was found that in specimens of *P. sergenti* infected by feeding on man the flagellates extended more than half way down the proboscis after six days at 27° C. Such an extension of the flagellates beyond the cardia was not noted by PATTON and HINDLE when this sand fly was experimentally infected with *L. donovani* in North China.

C. M. W

ADLER (S) A Note on the Transmission of *Leishmania tropica* directly from Sandfly (*Phlebotomus papatasi*) to Sandfly.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Aug. 22. Vol. 22. No. 2. pp. 177-178. [1 ref.] [Microbiol. Inst. Hebrew Univ. Jerusalem.]

The author has already described how sandflies can be infected with leishmania by allowing them to feed on cultural forms through a rabbit skin membrane.¹ It is now shown that by allowing sandflies to feed in a similar manner on sterile saline solution to which has been added a little inactivated defibrinated rabbit's blood and flagellates which have been removed without bacterial contamination from already infected sandflies infection results. It has thus been possible to pass the organism directly from one sandfly to another. It is possible that the same may apply to other insect borne viruses and that by the method described or modifications of it it would be possible to maintain a virus without having to pass it through its vertebrate host.

C. M. W

SHORTT (H. E.) D'SILVA (H. A. H.) & SWAMINATH (C. S.) Note on Dermal Leishmanoid.—*Indian J. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 239-240 [1 ref.]

By feeding sandflies *Phlebotomus argentipes* on a cutaneous lesion in a case of dermal leishmanoid in which leishmania had been demonstrated, it was shown that the insects became infected, and that the parasite developed in the same manner as *Leishmania donovani* from cases of kala azar. This affords evidence of the identity with *L. donovani* of the parasite found in the skin lesions.

C. M. W

MARZINOWSKI (E. L.) L'immunité dans le bouton d'Orient. [Immunity in Oriental Sore].—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21. No. 8. pp. 638-641 [9 refs.]

In 1904 the author inoculated himself with *Leishmania tropica* from a case of oriental sore. After an incubation period of 70 days a small papule appeared and in it 17 days later parasites were demonstrated. After a further three weeks the nodule was excised. Seven years later the author was again inoculated. At the site of inoculation there developed redness and oedema and finally suppuration on the ninth day. Three weeks later healing had taken place. Smears from these lesions revealed diplococci and degenerate leishmania, which persisted to the sixteenth day. At about the time of the author's second inoculation another doctor had inoculated himself and acquired a typical sore containing numerous leishmania. With material from this sore the author inoculated himself a third time. On the thirteenth or fourteenth day there was induration at the site and this developed into

a nodule and ulcerated. A marked lymphangitis also appeared. Numerous parasites were obtained from the ulcer. Healing took place in five months. With material from the ulcer four other people were inoculated. In each case a typical sore developed after an incubation period of fifteen days. The doctor referred to above, re-inoculated himself two months after the lesion produced by his first inoculation had healed. No sore resulted. Since his last experience the author has attempted to re-infect himself on four occasions without success. On another occasion 4 cc. of a culture of the organism were inoculated subcutaneously in the arm. This was followed by a somewhat violent inflammatory reaction which subsided on the fifth day leaving a small induration which subsequently disappeared. A monkey which had been inoculated subcutaneously with 3 cc. of the same culture in the supra-orbital region, died on the ninth day. In smears of the bone marrow a few leishmanias were found. From the experiments recorded it is evident that an immunity against oriental sore results from infection, and that this may persist for at least seven years.

C. M. W.

ALMEIDA (Paulo Mangabeira) O "Polypo da leishmaniose"
The Polypus of Leishmaniasis. — *Brasil Medico* 1928. July 7
Vol. 42. No. 27 pp. 729-737 With 6 text figs. [24 refs.]

The author mentions four cases of muco-cutaneous leishmaniasis in which nasal polyps occurred. The cases have been previously referred to by him, and though he had regarded the polyps as due to the leishmania infection, he had admitted that in the absence of histological examination the proof was not complete. He now gives a detailed and illustrated account of the histology of the polyps. Though they were similar in outward appearance to simple polyps and those encountered in the nose in syphilis and tuberculosis, structurally they differed from these, as also from the usual mucosal lesions due to leishmaniasis, the histology of which was described by KLOTZ and LINDENBERG. On this account the author feels that his original contention that the polyps were to be regarded as manifestations of the leishmania infection is correct.

C. M. W.

LERAT (R.) La guérison du bouton d'Orient par une nouvelle
thérapeutique le "synectol." [Cure of Oriental Sore by Synectol.]
— *Bull. Soc. Path. Exot.* 1928. Nov. 14 Vol. 21. No. 9.
pp. 764-768. With 2 text figs.

Under the name of Synectol the author describes an ointment which is prepared from the extract of various plants (*Cupressus sempervirens*, *Plumbago rosea*, *Mesembryanthemum crystallinum*, *Tenacium clusoides*, *Plantago lanceolata*). It is applied to the sore after removal of the scab at a temperature of 100° to 120° C. It produces for a second a sensation of heat, but it does not burn. Two days later the first application is removed and a fresh one made at a temperature of 60° to 80° C. Two further applications are made at two day intervals.

By this time the lesion has been sterilized of parasites, and will heal without scarring.

C. M. W.

- TALAAT (A.) Die Behandlung der Orientbeule mit 661 und 471 [Treatment of Oriental Sore with 661 and 471].—*Dermat. Woch.* 1928 Feb 25 Vol 86 No 8 pp 262-284

The paper describes four cases of oriental sore which responded rapidly to treatment by intravenous injections of either stibosan 471 or antimosan 661

C. M. W

- BLANC (Georges) & CAMINOPETROS (J) Sur quelques cas de bouton d'Orient observés à Athènes. [Cases of Oriental Sore at Athens].—*Grèce Méd* 1928 Mar-Apr Vol 30 No 3/4 pp 9-12. [8 refs.] Also in *Arch Inst Pasteur Hellénique* 1928. Vol 2. No 1 pp. 36-48. With 5 text figs [6 refs.]

In the Archives of the hospital of Syngros there are records of the attendance of 93 cases of oriental sore from 1916 onwards. Of these 60 came from Crete and the remainder from other islands or from the mainland. As 17 cases were from Athens itself, it appeared probable that the disease occurred endemically in the city. A careful survey of a certain quarter (Pangrati) of the city brought to light four cases two of which were undoubtedly autochthonous. Certain cases of the disease appear to be abortive in that there is little development of the lesions. Such are readily overlooked. As an illustration of this type of the disease, an inoculation experiment is mentioned. A volunteer 40 years of age was inoculated in the deltoid region with serum from a large sore on June 26th, 1925. On November 15th of the same year there were present three tiny papules in which numerous leishmanias were demonstrated. A year later the papules were still present, but showed hardly any increase in size. Parasites were still present and a rich culture was obtained.

C. M. W

- MESNARD (J) Un cas de leishmaniose cutanée (bouton d'Orient). Incubation particulièrement longue. Auto-observation. [Case of Dermal Leishmaniasis of Long Incubation].—*Bull Soc Path. Exot* 1928. Nov 14 Vol 21 No 9 pp. 761-763 [3 refs.] [Pasteur Inst., Hanoi.]

The author describes the appearance of a small nodule on the outer surface of his forearm in September 1927 in Tonkin. He had lived in Persia from 1920 to September 1924 when he returned to France via Baghdad, Palmyra, Damascus and Beirut. He resided in Paris and Anjou till his departure for Tonkin in December 1925. The nodule increased in size till in March 1928 it measured 3 cm. in diameter. Owing to the fact that oriental sore is unknown in Tonkin examination for leishmania was not made till, at the sixth month, being struck by the resemblance to lesions he had seen in Persia, the author made a search for these parasites. They were discovered in large numbers and a culture was obtained. The point of interest is the long incubation period. Infection must have occurred before September 1924 or shortly after this during the journey to France through endemic areas or as a result of an inoculation into the skin of the forearm of cultural forms of *Leishmania tropica* which was made at the beginning of 1923. In the one case the incubation period would be three years in other four and a-half years.

C. M. W

Buss (G) *Psooriasis und Hantleishmaniose* [*Psooriasis and Cutaneous Leishmaniasis*].—*Arch f Schiff- u Trop Hyg* 1928. Aug Vol. 32. No 8. pp 391-401 With 6 text figs. [11 refs] [Kaiser Wilhelm Society for Advancement of Science, São Paulo Brazil]

The paper describes the case of a man 36 years of age who became infected with the parasite of cutaneous leishmaniasis after having suffered from generalized psoriasis for 9 years. An ulcer developed in the leg and three months later there appeared on various parts of the body affected with psoriasis over 300 small nodules some of which, after increasing slightly in size, ulcerated. Examination of many of these lesions revealed the presence of leishmania. It would appear that the primary leishmanian lesion was in the leg and that the simultaneous development of the nodules is an indication that the parasites were distributed by the blood stream.

C. M. W.

PONS LEYCHARD (A) *Chronique du bouton d'Orient en Algérie. Un troisième cas de bouton d'Orient dans le Tell oranais (le 32e en Algérie, hors des régions sahariennes)* [Third and Fourth Cases of Oriental Sore in the Tell].—*Arch Inst Pasteur d'Algérie* 1928. Mar Vol 6. No 1 pp 23-24

RAYNAUD (Lucien) & COLONTEU (E.) *Un nouveau cas de bouton d'Orient contracté dans le Tell*—*Ibid* p 25 With 1 plate

These two papers describe the 32nd and 33rd cases of oriental sore in which infection was acquired outside the large endemic area of the Sahara.

C. M. W.

PANAYOTATOU (Angélique) *Sur un cas de leishmaniose cutanée ou bouton d'Orient de la face* [Case of Oriental Sore of the Face].—*Rec Méd et Hyg Trop* 1928. July-Aug Vol. 20. No 4 pp 114-118. With 2 text figs. [5 refs]

A case of oriental sore in a child in Alexandria where the disease is rarely met with (see this Bulletin Vol. 21 p. 259). A cure was effected by injections of emetine round the sore and application of dressing soaked in a solution of this drug.

C. M. W.

LANTERI (G) *Peculiar forme riproduttive (processo di divisione per strozzamento) della Leishmania tropica in un caso di Bottono d'Oriente.* [Peculiar Reproductive Forms of *L. tropica*].—*Gazz. Ital di Dermat e Sfil* 1928. June Vol. 69. Year 63. No 3 pp. 825-834. With 3 figs. [47 refs]

In smears from a case of oriental sore the author discovered bodies which appeared to be leishmania reproducing by constriction into two parts. [The figure given of about 30 parasites undergoing this method of reproduction reminds the reviewer of budding yeasts rather than leishmania.]

C. M. W.

MORITA (Conha) *A reação gigante-celular na leishmaniose tegumentar cutânea.* [Giant Cell Reaction in Dermal Leishmaniasis].—*Brasil-Médico* 1928. Sept 15 Vol. 42. No 37 pp 1034-1036. With 3 figs. [English summary pp 1036-1037] [Faculty of Med., São Paulo, Brazil]

In cutaneous leishmaniasis the cellular reaction may be mainly one of giant cell formation. Giant cells which have no relationship to the

leishmania may be induced by the presence of foreign bodies in the lesions. When these cells occur in lesions which are in process of cicatrization their origin is always of a doubtful nature

C M W

SALLE (A J) & SCHMIDT (Carl L A) *The Metabolism of Leishmania tropica*—*Jl Infect Dis* 1928 Nov Vol. 43 No 5 pp 378-384 [25 refs] [Med. School, Univ of California, Berkeley]

By growing *Leishmania tropica* in a standard medium and in media in which certain variations were made the metabolic activities of the organism were determined. They do not differ essentially from those of many bacteria. Carbohydrate exerts a marked sparing action towards the protein. The organism possesses marked proteolytic powers as demonstrated by an increase in the ammonia and split protein products and rise in pH. The organism cannot survive under anaerobic conditions. The haemoglobin in the medium may function by contributing an accessory food or growth factor.

C M W

WEISS (Pedro) *La espondia es una leishmaniasis tegumentaria* [Espundia, a Dermal Leishmaniasis].—*Crónica Méd* Lima 1928 July Vol. 45 No 781 pp 200-210

A German version of this paper was reviewed in this *Bulletin* Vol 25 p 72.

C M W

LEGER (Marcel) *Leishmanioses viscerales e tegumentares. Identidade ou parentesco estreito das diferentes leishmanias* [Visceral and Dermal Leishmaniasis. Their Relations].—*Rev Med Cirurg do Brasil* 1928 May Vol. 38 No 5 pp 195-204 [22 refs]

A review of literature dealing with the relationship of the various leishmania to one another.

C M W

GRAHAM (J D) *Résumé des travaux de la Commission du Kala Azar dans l'Inde Britannique pendant l'exercice 1927-1928* [Summary of the Work of the Indian Kala Azar Commission in 1927-1928].—*Bull Office Internat d Hyg Publique* 1928 Oct. Vol 20 No 10 pp 1618-1623 [1 ref]

This article is a summary of the results obtained by the Indian Kala Azar Commission.

C M W

CORTES (Narciso Alonso F) *Notas preliminares sobre la leishmaniosis visceral en la provincia de Cadix* [Kala Azar in the Province of Cadix].—*Medicina Paises Calidos* Madrid 1928 July Vol 1 No 4 p 382.

The institution of an anti malaria campaign in the province of Cadix in 1927 enabled observations to be made with reference to the presence of kala azar. The survey has brought to light nine cases of the disease diagnosed by spleen puncture and by clinical examination. Four of the cases came from Arcos two from Xeres and one each from Bosque Ubrique and Espera.

C M W

DE LA VEGA (Jimena F) Un nuevo caso de leishmaniosis visceral en adulto [Case of Kala Azar in an Adult in Spain.]—*Medicina Paises Cálidos* Madrid. 1928 Sept. Vol. 1 No 5 pp 432-433. [Faculty of Med., Madrid]

Kala azar in Spain is usually of the infantile type. The paper describes a case in a man 29 years of age who had spent his life in various places in the Province of Madrid. Treatment with stibenyi produced a marked improvement in the clinical condition.

C. M. W

ANGUOLOTTI (E) Un caso de leishmaniosis visceral diagnosticado "post mortem." [Case of Kala Azar in Spain, diagnosed after Death.]—*Medicina Paises Cálidos* Madrid. 1928. Nov Vol. 1 No 6 p 550

A note of a case in Spain which was diagnosed as kala azar by discovery of the organism after death.

C. M. W

MESLAY-COINTE & COCHER Kala-azar méditerranéen chez un adulte. [Mediterranean Kala Azar in an Adult.]—*Rev Méd et Hyg Trop* 1928. July-Aug Vol 20 No. 4 pp 109-113 With 1 chart in text.

A case of kala azar in a soldier 22 years of age who died in Paris after his return from Algeria, the diagnosis being made only after death following splenectomy performed for supposed Banti's disease

C. M. W

BOYD (T. C.) & ROY (A. C.) A Preliminary Note on the Decolourisation of a Solution of Methylene Blue when left in Contact with Kala Azar Serum.—*Indian Med Gaz* 1928. Oct. Vol. 63 No 10 p 588.

Kala azar serum in which a certain gram negative bacillus was growing had the property of decolourising solutions of methylene blue. Apparently normal serum did not do this.

C. M. W

BÉKÉNYIACK (M. E.) [Catalase sanguine dans la leishmaniose viscérale] [Blood Catalase in Kala Azar.]—*Pravda Méd. d'Usbekistane* Tashkent. 1928. June-July No 9/10 pp 31-36 [In Russian. French summary p 97]

In 17 cases of kala azar it was noted that there was a marked diminution in catalase as estimated by the method of BACH and ZOURKOWA. Even long after treatment and convalescence the figure of 3.24 rarely rose to 8 or 10

C. M. W

ANTONOVSKY (A. S.) [Guérison de quatre cas de leishmaniose en présence d'une médication insuffisante.]—*Russien J1 Trop Méd.* 1928. Vol 6 No. 7 pp 414-418 [4 refs.] [In Russian.]
 MININA (R. P.) [La leishmaniose dans le bouton d'Orient.]—*Russien J1 Trop Méd.* 1928. Vol 6 No. 6. pp. 349-351 [3 refs.] [In Russian.]
 PROUDOMYCH (V. O.) [Traitement de la leishmaniose cutanée par l'orthophosphore.]—*Pravda Méd. d'Usbekistane* Tashkent. 1928. Aug No. 11 pp. 23-26 [In Russian. French summary p. 103.]

LEPROSY

VEDDER (Edward B) A Discussion of the Etiology of Leprosy, with Especial Reference to the Possibility of the Transference of Leprosy by Insects, and the Experimental Inoculation of Three Men.—*Philippine Jl Sci* 1928. Nov Vol. 37 No. 3 pp 215-245 With 6 text figs. [28 refs.]

From an interesting discussion of well known data Vedder concludes that the small percentage of persons living in close contact with lepers who become infected may be explained equally well by insect transmission as by direct contagion. Charts showing the relation between the incidence of leprosy in different provinces of the Philippine Islands and other data given show a general but irregular relation of leprosy incidence to density of population the proportion of cultivated land, and to the poverty of the people but none of these factors is considered to be of major importance. Nearly 100 *Aedes aegypti* mosquitoes were fed on nodular or macular leprosy lesions rich in acid fast bacilli, and in 41 per cent. acid fast bacilli were found on immediate microscopical examination, so that they might easily infect anyone bitten soon after such a feed. With the sanction of Governor-General Wood, three long time volunteer prisoners out of a number available with clean family histories and previous isolation in jail for two years were submitted to experiment one by the intradermal injection of fresh leprosy nodule material and the other two by repeated bites of from 42 to 82 *Aedes aegypti* just previously fed on the skin over positive nodular and macular leprosy lesions. Up to the time the author left the Philippines, about two years later the results in all were negative but the prisoners will be kept under observation as the author points out a negative result may be due to insusceptibility of the subjects.

L. Rogers.

LEPROSY NOTES. 1928. Oct No 3 32 pp and 1929 Jan. No. 4 32 pp. Issued quarterly by the British Empire Leprosy Relief Association 24 Cavendish Square London W1

This is a new quarterly publication of The British Empire Leprosy Relief Association containing short articles on leprosy work in the British possessions and elsewhere for distribution to workers on leprosy. Some of the papers deal with work already recorded in this *Bulletin* so only brief notes of anti leprosy activity from little known centres can be mentioned here. The successful cultivation of *Hydnocarpus wrightiana* and *anthelmintica* trees from seed distributed by the Association is reported from five of our colonies in tropical Africa, as well as British Guiana the West Indies and Fiji, and fruit has already been obtained in the last so good supplies of these oils will soon be widely available. It is reported that lepers are flocking for treatment to colonies founded for them in several of our African possessions in such numbers that all cannot at present be accommodated, and wholly on a voluntary basis. Land for cultivation is provided wherever possible so that the colonies soon become self-supporting as regards food, and hutting accommodation and dispensaries and drugs for treatment are being provided by the Association in many areas, especially of

Africa. An article on leprosy in the Baltic countries shows 702 known cases. In Brazil Dr de Souza ARAUJO estimates the lepers at 24,000, or 0.67 per mille and ten leper colonies are needed.

An interesting account of the foundation of a leper colony at Idu in South Nigeria, with the help of the Nigerian Government and the Association by Dr A. B. MACDONALD records that over 1 000 new voluntary patients have been treated there in a little over a year. In Tanganyika Territory Dr J. O. SHIRCOCK records 3,299 lepers in 42 voluntary leper segregation camps, but since the visit of Mr Frank OLDKIEVE, the Secretary to the Association, to this colony several treatment and investigation centres have been established under missionary doctors with the help of the Government and the Association, and they are already attracting a number of lepers. In Southern Nyasaland such a treatment centre under Dr C. F. BIRKENSTOCK, has 80 cases under treatment, and with sufficient facilities 500 could be obtained within a few months. The results are said to be very gratifying under hydnoceol, alepol and potassium iodide treatment, and eight recovered patients have been discharged without any relapses.

In India the model leper hospital at Dichpali, under the Rev G. M. KERR, Dr ISABEL KERR and Dr LOWE, has been developed into a regular teaching centre for the South of India on the lines of Dr MITT's clinic in Calcutta. No "burnt-out" cases are now admitted, so all are benefiting by the treatment including private patients, the accommodation for whom is always full. In Bengal Dr MITT's leprosy surveys are being continued, and are resulting in the steady increase in the number of leper dispensaries supported by the local authorities. Altogether a very healthy increased interest in the leprosy problem throughout our Empire is revealed by this little publication, especially if compared with the apparently hopeless outlook for the leper only about a single decade ago.

L. R.

MAXWELL (James L.) *Leprosy The Problem of its Eradication from China.*—*China Med J* 1928. Dec. Vol. 42. No. 12. pp. 860-879 [1 ref.]

Leprosy may go back as far as 1100 B.C. in China, and it would appear probable that the disease reached south-east China from India by sea. It is now very wide-spread, and the total number of lepers must run into hundreds of thousands mostly in the South, and in Shantung, Manchuria and Korea in the north. The writer agrees with the common view that segregation started the decrease of leprosy in Western Europe in the Middle Ages, and improved economic conditions completed the process of its disappearance so these factors have to be considered in China, where improved economic conditions as well as isolation are essential to complete success. He is however convinced that under present conditions strict compulsory segregation would be "more likely to assist in spreading leprosy than in eradicating it." In early European days of small villages, lepers could be effectively expelled to leper houses, but with present day large towns and easy communications it is impracticable anywhere on account of the facilities for hiding cases with consequent spread of the disease. Any attempt to isolate such a chronic disease is illogical and impracticable especially in a densely populated, badly infected country such as China. It has failed even in the case of the far more dangerous and few typhoid

carriers. The truth is that in relation to lepers and leprosy there is a condition of nearly world wide and acute hysteria which will stop to consider neither reason nor logic.

A third and very important factor is that the cure of leprosy is a definite and increasingly important fact. He uses the word cure in the clinical sense as in tuberculosis and not in the pathological one of the elimination of the last bacillus from the body but that the patient is free from active infection and able to resume normal life without being a menace to others. Such clinical cures should be effected in practically every early case and in 15 to 20 per cent of long standing cases of 8 years duration. The latter should receive treatment but the essential thing is to find and treat the early cases and compulsory segregation will defeat this object by causing such to be hidden so drastic measures do more harm than good in the present day. He therefore advocates voluntary isolation and care of advanced infective and ulcerated cases and hospitals for the treatment of earlier more amenable ones and where possible ROGERS plan of six monthly examinations of all house contacts, to detect and treat the earliest infections from them and lastly education to bring home to the people the value of treatment especially in the early stages. In some of the cities notification of early cases could be enforced with good results. [These views of such an authority on China are most timely and are in accordance with the policy of the British Empire Leprosy Relief Association regarding all tropical British possessions and especially those in Central Africa.]

L. R.

GREEN (Richard) *Annual Report of the Medical Officer in Charge, Lepet Asylum, Kuala Lumpur — Federated Malay States Ann Rep Med. Dept Year 1927 Appendix N pp 144-149*

The number of lepers treated in 1927 was 818 against 704 in the previous year. The admissions numbered 226 of which no less than 104 were self-diagnosed voluntary admissions, a good testimony to the care and efficient treatment they receive. The rest were diagnosed at hospitals and sent to the institution. Moreover a large proportion of the voluntary cases are early ones in place of the advanced cases formerly coming as a last resort. Thirty-one cases have lost all clinical signs but 9 are still positive bacteriologically and none will be discharged until longer negative. TRAVERS oral use of *H antihelmintica* nuts with *Cannabis indica* after the old Chinese plan is still considered to be the most convenient form of treatment, and E.C.C.O. injections are also given with promising results if long continued. Injections of colloidal antimony and local applications of mercurochrome 220 or 1 per cent methyl violet are of use for ulcers. The leprous reaction is discussed and some interesting observations are recorded to show that the intra-dermal injection of lepra bacilli from a freshly excised nodule produces soft reddish patches containing few bacilli only if injected during a reactive or sensitized phase indicating that these fresh reaction lesions are produced by reactions where a few bacilli are present, and are not due to further dissemination of bacilli. This the most commonly accepted view indicates that such reactions are a favourable phenomenon. Segregation of all lepers including old

anaesthetic cases is still considered essential in Malaya, although only bacteriologically positive cases appear to be admitted, so that early negative and most easily cured cases, are apparently not provided for

L. R.

TRISSEUIL (G.) Prophylaxie de la lèpre en 1927 à l'Institut "Gaston Bourret" (Nouvelle-Calédonie) [Prophylaxis of Leprosy in New Caledonia in 1927]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 288-293

The campaign against leprosy includes annual inspections of schools, of all immigrants and emigrants, and of the tribes for cases of the disease. The inspections showed a clear increase of the disease among the Oubatche tribe, but stationary or decreasing numbers among the others. The chaulmoogra ethyl esters are used in treatment with advantage. The "leproseries partielles" allow the cases to be isolated not far from their own people and they now contain 607 lepers and 896 suspects including 23 Europeans. The definite cases have decreased somewhat in the last decade but the suspects have increased considerably. Where missionaries are available the treatment is more regular and effective

L. R.

RAMSAY (G. W. St. C.) A Study of Leprosy in Southern Nigeria.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Nov. 25. Vol. 22. No. 3. pp. 249-266. [7 refs.]

This article deals with observations made during a brief visit to the United Free Church Mission Leper Colony at Itu in South Nigeria with 616 inmates, founded by Dr. MACDONALD. The disease is considered to be a serious menace to the country and compulsory segregation is impracticable. Many lepers are driven out of their villages or even murdered, and the Government leased 30 acres of good ground for this colony for cultivation by the lepers, and drugs have been supplied by the British Empire Leprosy Relief Association. The average duration of the disease on admission was six years, 76 per cent. of the cases began between the ages of 16 to 35 years, over two-thirds were males, 80 per cent. were of the maculo-anaesthetic type, 23.5 per cent. showed deformities, scabies was present in 32 per cent. and many showed helminthic or filarial infection. Bacteriological examinations showed positive results in only 21.6 per cent. owing to the rate being only 9.7 per cent. in the common maculo-anaesthetic type but 85.2 per cent. of the nodular cases and 68.7 per cent. of the mixed cases were positive. The Sachs-Georgi test was done in all the cases, as the full Wassermann test was not practicable and positive reactions due to the presence of syphilis and yaws were obtained in 42.7 per cent., indicating anti-spirochaetal treatment.

L. R.

COOKE (F. H.) Leprosy in the British Mandated Territory of Togoland.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 301-304. With 2 figs. on 1 plate.

Before the advent of the whites lepers were expelled from their villages into special leper ones, forbidden to marry and fed by their

relatives. The Germans attempted compulsory segregation but the cases were hidden and infected the healthy while the more effective old native isolation has been abandoned. The author found the disease very common so he erected a temporary camp for voluntary inmates and in about a year it was filled with 82 lepers and many had to be turned away but some attend as out patients for treatment. The Chiefs are helping to build more accommodation and the great advantages of the voluntary over the compulsory plan is already evident while the 26 acres of land allow of cultivation. Injections of ethyl esters in the form of 5 cc. doses of moogrol, are given, and potassium iodide and sodium salicylate orally afford great relief of pains and in some slow absorption of nodules occurs. Reactions were followed by more rapid improvement.

L. R.

REMLINGER (P) L'état de la lèpre au Maroc. [*Leprosy in Morocco.*]—*Bull. Soc. Path. Exot.* 1928. Oct. 10 Vol 21 No 8 pp 611-616. With 1 text fig [19 refs.]

This account gives little new information. In 1927 ROBINEAU reported not less than 197 cases in Fez in four years and the official estimate was 302 in 1925. Hospitals for the more active contagious cases and agricultural colonies for more benign forms are advocated.

L. R.

BALINA (Pedro L.) Estado actual del problema de la lepra en nuestro país. [*Leprosy in Argentina at the Present Day*].—*Semana Méd.* 1928. Nov 22. Vol. 35 No 47 (1819) pp 1381-1405 With 3 text figs. [13 refs.]

This article consists of four parts and an appendix. In the first is given an account of the distribution of leprosy in the Argentine and particularly of the inferences which may be drawn from the author's own experiences. He states that between 1910 and 1921 he himself attended 142 cases whereas during the last 7 years he has had 229 fresh cases which he regards as an increase of 166 per cent. of lepers in Buenos Aires. From figures obtained from the Department of Hygiene the total is over 1 500. Maps are given showing the distribution in the various provinces from which it is evident that leprosy is present in all. It is noted that many are living in Buenos Aires, and that prophylaxis is impracticable where there are 200 lepers within the city itself. The second part is a brief consideration of the legal enactments and their development to the present time. In part III the question of the possibility of overcoming leprosy in the Argentine is dealt with and the author believes that if preventive measures were properly and scientifically carried out there is no reason why the province should not be made perfectly healthy in this respect but isolation is the first basis of any measure. Part IV goes in more detail into the author's suggestions. He recommends the establishment of six fresh leproseries. Next are mentioned the different modes of dealing with the cases according to the stages of their disease on the usual lines.

H. Harold Scott

PERALTA RAMOS (Alberto) *Lepros y embarazo Puede estar justificada la interrupción artificial de la gestación y la esterilización definitiva?* [Leprosy and Pregnancy Are Interference with the Course of Gestation and Performance of Sterilization Justifiable?—*Semana Méd.* 1928. Oct. 18. Vol. 35. No. 42. pp. 1013-1017]

This is an interesting article, but those who look for any definite pronouncement will suffer disappointment. The reasons for terminating pregnancy prematurely are naturally all for the benefit of the mother. In the case of leprosy the question is largely one of eugenics and social hygiene. The case is described of a woman of 30 years with five healthy children, now again seven months pregnant and showing signs of leprosy which had been diagnosed two months previously. Labour was induced and sterilization carried out.

H. Harold Scott.

RODRIGUEZ (Jose) *Diagnostic Problems of Leprosy*—*Jl. Philippine Islands Med. Assoc.* 1928. Sept. Vol. 8. No. 9 pp. 585-590.

This is a lecture dealing with the clinical diagnosis of early leprosy in bacteriologically negative cases to allow of early treatment. Stress is laid on loss of sensation to temperature, followed by that to pain, both occurring before that to touch. Paresthesia in the absence of loss of the knee jerks is also a valuable early sign. Leucoderma, tinea flava, seborrhoea, scleroderma, psoriasis and lupus erythematosus and vulgaris are the skin affections most likely to be confused with leprosy.

L. R.

LEGER (Marcel) *La lèpre et son diagnostic bactérioscopique.* [Bacteriological Diagnosis of Leprosy]—*Presse Méd.* 1928. Dec. 19 Vol. 36. No. 101 pp. 1615-1616.

This paper deals with the ordinary methods of bacteriological diagnosis and records that in Senegal in the skin form 86 per cent. showed acid fast bacilli in the nose, and 46 per cent. of nerve cases were positive. The value of gland puncture in revealing the leproa bacillus after the skin and nose have become negative is confirmed.

L. R.

MONACELLI (M.) *Sulla reazione di Rubino nella lepra.* [Rubino's Reaction in Leprosy]—*Giorn. Ital. di Dermat. e Sifil.* 1928. Oct. Vol. 69 Year 63 No. 5 pp. 1472-1478. [8 refs.] [Dermo-Syph. Clinic, Univ. Rome.]

This reaction, first announced in June 1926 consists in mixing the serum with an equal volume of a suspension of sheep's corpuscles to which has been added a definite amount of formalin [see this *Bulletin*, Vol. 24 p. 557]. A uniformly opaque mixture results which slowly clears by sedimentation of red cells after several hours in the case of normal serum, rapidly with leptotic. RUBINO reported 25 positive out of 32 lepers and, later 88 out of 121 while only 7 of 300 controls reacted positively. Others notably PAULLIER & ERRECART and MARCHOUX & CARO [*l.c.* Vol. 25, p. 978], have repeated his tests with

varying results. The former found 6 out of 17 lepra sera negative and 5 of 60 controls positive. RUBINO insists that his test is quite distinct from the corpuscle-sedimentation test

The author has used MARCHOUX's modified technique the details being given as follows —

A certain volume of defibrinated blood of a sheep is repeatedly washed and then made up to the original volume with normal saline Formalin to 10 per cent. is then added, and the whole left at room temperature for 24 hours again washed three or four times and brought to the original volume with saline as before. A thick, turbid brown fluid results. 0.2 cc. of this is added to 1 cc. of serum in a test tube well shaken to obtain a uniform suspension and then placed at 37° C. In a few minutes, 30 at most, the corpuscles collect in a mass at the bottom, leaving the clear fluid above in the case of leprosy. A normal serum sediments but very slowly taking several hours. Of 13 leper patients 12 gave a positive these were all either the nodular or mixed forms the only negative was a patient with anaesthetic leprosy. 45 controls were all negative. The test should prove useful, therefore where leprosy is diffuse and it is desired to test a large number of individuals.

H Harold Scott.

STANZIALE (R.) *The Value of examining the Cerebro-Spinal Fluid in Leprosy* — *Jl Trop Med & Hyg* 1928 Dec. 1 Vol. 31 No 23 pp 305-306 [5 refs.]

Ten cases of the nodular anaesthetic type were examined with the following results. Positive Wassermann reactions were found in six, excess of globulin in five and hyperalbuminosis in four but in only one were all three reactions obtained. Lymphocytosis of from 1.4 to 56 elements per cmm. was found in five cases. No lepra bacilli could be detected even with the centrifuge. The inconstant nature of the changes found indicates that they are of no practical importance.

L. R.

WAYSON (N. E.) & BADGER (L. F.) *The Oral Administration of Derivatives of Chaulmoogra Oil in Leprosy* — *Public Health Rep* 1928. Nov. 2. Vol. 43 No 44 pp 2883-2884 [1 ref.]

This brief note records the efforts of DENNY and others to reduce the irritant effects of oral and intramuscular administration of chaulmoogra oil and its derivatives. A preparation of ethyl esters made as follows has been used orally for six months without noticeable gastrointestinal symptoms —

"The preparation is an emulsion in acacia and simple syrup of equal parts of the mixed esters of chaulmoogra oil, and of cod-liver oil to which iodine is added to make six one-hundredths per cent. The detail of manufacture is as follows. No 1 — Dissolve 0.625 gram iodine in 250 cubic centimeters esters and heat at 100° C. for one-half hour. Cool and add 250 cubic centimeters cod liver oil. Add 60 grams of powdered gum acacia and mix thoroughly. No 2 — Dissolve 65 grams gum acacia in 250 cubic centimeters cold water and when dissolved add 100 cubic centimeters of cane syrup (made by making a saturated solution of sugar in water at 100° C. and then cooling). Add enough water to make a volume of 430 cubic centimeters. Pour No 1 into No. 2 and beat with egg beater

until emulsified, then add slowly 70 cubic centimeters 85 per cent. alcohol while continuing to beat. The mixture is of about the same consistency as that of the U.S.P. emulsion of cod-liver oil, remains emulsified, and apparently does not deteriorate during periods of six weeks at room temperature.

The dosage has been given daily. The amount of the dose has been started at 1 or 2 cubic centimeters of the mixture (one-quarter to one-half cubic centimetre of the esters) and gradually increased. Tentatively the maximum dosage to be used has been set at 10 cubic centimeters of esters per week per hundred pounds weight of patient.

L. R.

WELCH (T. B.) Oil of Hydnocarpus and Alepol. An Appreciation.—*Jl Port-of-Spain Med Soc* 1927 pp 5-11

This paper deals with a careful trial of oil of hydnocarpus and of alepol (sodium hydnocarpate). The author divides his cases clinically into suspects, primary anaesthetic, early cutaneous, late cutaneous and secondary anaesthetic, the last meaning uninfected mutilated or the burnt-out class of MUR, who do not require either segregation or treatment as lepers. The dosage is carefully regulated to produce repeated very slight reactions with breaking up of some lepra bacilli and gradual production of immunity. He agrees with MUR in positing the doses in the early and in the late stage, but using much care in the active nodular cases to avoid severe debilitating reactions. The injections are given twice weekly and the doses gradually increased from 1 to 10 cc. of either the oil or of a 3 or even a 4 per cent. solution of alepol with $\frac{1}{2}$ per cent. carbolic. Later alepol in 1 or 2 per cent solution may be given intravenously in cases not reacting otherwise. Children do especially well, and good general condition of the patients and exercise are advisable. He finds alepol to be less painful, better absorbed and more active than the whole oil, and he considers alepol "a very important contribution to modern methods of treating leprosy." Patience and care are required and much remains to be done, but the outlook is good.

L. R.

PIERINI (Luís E.) Tratamiento de la lepra. [The Treatment of Leprosy].—*Semana Méd* 1928, Nov 1 Vol. 35 No. 44 (1816), pp. 1183-1201 [40 refs.]

This article consists of three parts. The first is a general description and consideration of preparations of chanmoogra; the other two contain records of the author's personal observations on patients at the Muxix hospital. In the second part brief notes are given of 63 cases, though it is stated that 82 were treated with ethyl esters and the same number with the oil (mainly Heiser's or Defillo's formula).

Each received in all about 300 cc. and a comparison of the results shows: Definite cures, 1 by each method; apparent cures (but bacilli still found) 2 by the former 4 by the latter; much improved 9 and 11 respectively; improved 11 and 7; no improvement 5 and 8; dead 4 and 1. In other words, the results were closely similar the advantage, if any being with the oil. In the third part, other drugs employed are spoken of in turn: antimony Oacoi Stilbium (6 cases) sanocrysis (five cases) naxtin (3 cases) cryotherapy (5 cases).

Amongst the final conclusions it is stated that chaulmoogra remains the best remedy and the oil (Heiser's formula) has proved in his patients better than the ethyl esters the response is quick in early cases and the improvement is earlier and more certain in macular or maculo-anæsthetic forms than in the nodular or mixed finally treatment must be persevered with, the length of the course depending on the time the disease has persisted, the clinical form the extent of the lesions and the toleration of the drug by the patient

H Harold Scott.

MAXWELL (James L.) *Brief Instructions for the Treatment of Lepers.*—*China Med J* 1928 Sept Vol. 42. No 9 pp 694-697

This paper gives the usual dosage of alepol, which is held to be the simplest and probably the most effective preparation at present available and also those of ethyl esters and potassium iodide by Muir's plan, together with the usual local applications. Reprints can be obtained free from The Mission to Lepers 23 Yuen Ming Yuen Road Shanghai.

L. R

HENDERSON (John M) & CHATTERJI (S P) *Notes on the Use of Certain Preparations in Leprosy*—*Indian Med Gaz* 1928 Nov Vol. 63 No 11 pp 620-624 [7 refs.]

Copper chloride-p-diazoiminobenzene hydrochloride supplied by Dr T A HENRY of the Wellcome Chemical Research Laboratories, and containing 14.3 per cent of metallic copper is unstable but can be used in freshly made solution and is said to be sterile it cannot be heated. It has been given intravenously twice or thrice weekly in doses of from 1 to 10 cc. of a solution of 0.02 gm. in 10 cc. sterile water. No toxic effects were produced and in small doses it lessened nerve pain and in large doses it produced some leprous reaction, but apparently with little beneficial action on the disease.

Another preparation of unrevealed composition called succinol has also been tried in leprosy without benefit.

Fibrolysin of Merck & Co has also been tested, but it produced unpleasant nervous sequelae and no beneficial action on leprous tissues.

L. R.

BOURGEOIS & TSATSARONIS *Sur un cas de lèpre traité par la bactériothérapie* [*Case of Leprosy treated by Bacteriotherapy*]—*Progrès Méd.* 1928 July 7 No 27 pp 1115-1116

This is an interesting case of nodular leprosy successfully treated by protein shock by means of a modified bacterial injection on the lines of HASSON'S method including some acid fast bacilli from lepromata. A few injections of creosoted chaulmoogra oil were also given and the patient became bacteriologically negative and the lepromes healed after twenty doses of the vaccine in three months, and he has remained well for a year.

L. R.

until emulsified, then add slowly 70 cubic centimeters 95 per cent. alcohol while continuing to beat. The mixture is of about the same consistency as that of the U.S.P. emulsion of cod liver oil, remains emulsified, and apparently does not deteriorate during periods of six weeks at room temperature.

The dosage has been given daily. The amount of the dose has been started at 1 or 2 cubic centimeters of the mixture (one-quarter to one-half cubic centimetre of the esters) and gradually increased. Tentatively the maximum dosage to be used has been set at 10 cubic centimeters of ester per week per hundred pounds weight of patient.

L. R.

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Jl Port-of Spain Med Soc 1922 pp 5-11

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L. R.

PIERINI (Luis E.) Tratamiento de la lepra. [The Treatment of Leprosy]—*Semana Med* 1923, Nov 1 Vol. 35 No. 44 (1916). pp 1183-1201 [40 refs.]

This article consists of three parts. The first is a general description and consideration of preparations of chaulmoogra; the other two contain records of the author's personal observations on patients at the Mufis hospital. In the second part brief notes are given of 63 cases, though it is stated that 32 were treated with ethyl esters and the same number with the oil (mainly Heiser's or Defillo's formula).

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- i LAI (Daniel G) & LAI (Suchen Wang) **The Kahn Reaction in Leprosy A Study of 167 Lepers in Swatow District.**—*China Med J* 1928 Dec. Vol. 42. No 12. pp. 880-883 [8 refs] [Josephine Bixby Memorial Hosp Kityang, Kwangtung]
- ii WISE (Fred) **Leprosy A Review of Recent Advances in Serology and Immunology**—*Southern Med J* 1928 Oct Vol. 21 No 10 pp 837-842. [33 refs]
- iii LABERNADIE & ANDRÉ **Recherches sur le sang des lépreux. [Blood Researches in Leprosy]**—*Ann de Méd et de Pharm Colon* 1928 July-Aug-Sept Vol. 26 No 3 pp 323-328. [6 refs]
- iv HAYASHI (Fumio) **[On Sedimentation Speed of Erythrocytes in Leprosy]**—*Japanese J Dermat & Urol* 1928. Sept Vol. 28 No 9 pp 871-892. [14 refs.] [In Japanese English summary pp 62-64] [Zensei Leper Colony Tokyo]
- v OHMICHU (Naiochi) **[On Isoagglutination in Leprosy]**—*Hifuka Hishunyokaka Zasshi (J Dermat & Urol)* 1928. Mar Vol 28 No 3 [Summarized in *Japan Med World* 1928. Aug 15 Vol 8. No 8 pp 217-218]

i. The authors obtained a positive reaction with the Kahn test in only 12.5 per cent. of 165 lepers in South China, and their syphilis rate of general patients was 13.5 per cent. One-third of their positive Kahn tests in lepers were also clinically positive for syphilis so they regard the Kahn test as being generally negative in lepers without co-existing syphilis.

ii. This paper reviews recent literature already dealt with in this *Bulletin* and concludes that no reliable blood test for separating leprosy from syphilis and tubercle yet exists.

iii. The authors have carried out a number of careful tests in leprosy and they conclude that the Bordet Wassermann (Hecht Bauer-Mutermilch) test is not more frequently positive in leprosy than in general patients in the Pondicherry hospital, and that the reaction of Matefy is also useless in the diagnosis of leprosy. The red corpuscles sedimentation time is however clearly accelerated in leprosy especially in nodular and mixed types and is of diagnostic value in the absence of fever and tuberculosis.

iv. This author has tested the rate of sedimentation of the red corpuscles in a large number of leprosy patients and he concludes. The velocity is increasing proportionately to the seriousness and progressivity of patients.

v. This short abstract records the results of isoagglutination in leprosy as: Among AB group 9 per cent. A group 24 per cent. B group 35 per cent. and O group 32 per cent. of leprosy.

L. R.

GOMES (J. M.) & JUNIOR (J. Duarte do Prado) **Desvio do complemento na lepra. [Complement-Fixation in Leprosy]**—*Brasil Medico* 1928. Aug 25 Vol. 42. No 34 pp 951-956 [Inst. Hyg São Paulo]

The authors had previously reported on the value of the complement fixation test in leprosy. They here bring forward more cases (selected from a larger number) illustrative of its value in their hands. As antigen they use the defatted *Streptothrix leproides* of Deycke. The

cases are divided into four groups: 1. Apparently mild cases giving a strong positive reaction: there are twelve instances of this. 2. Cases (8 in number) clinically positive, but giving a negative reaction. 3. Persons under observation (5 here detailed) presenting no clinical evidence of disease, whose serum, a year previously negative, gives now a definitely positive reaction. 4. The effect on the serological test (10 cases) when patients are under treatment.

The authors place much reliance on the test both for diagnosis and for prognosis. Though some sera are negative in the early stages, they soon become positive: the negative are often those where skin lesions only are present and the negative result is probably due to the fact that the lesions remaining local, antibodies have not developed. Generally speaking, the degree of reaction was found to correspond with the severity of the symptoms, and where the symptoms improved but the reaction remained strongly positive relapses usually occurred and the prognosis was bad.

H. Harold Scott.

FRANCHINI (Giuseppe). Ancora sulla riproduzione sperimentale della lebbra nella scimmia. [*Leprosy produced Experimentally in the Monkey*].—*Arch. Ital. Sci. Med. Colon.* 1928. Apr. Vol. 9. No. 4. pp. 195-198. With 1 text fig. & 1 coloured plate. [1 ref.] (Inst. of Trop. Path. Univ. Bologna.)

It has been recorded that leproma tissue inoculated into a monkey (*M. sinicus*) leads to the formation of a tumour rich in lepra bacilli, but the lesion undergoes spontaneous cure within a brief period of two months or so. Professor Franchini places on record one such instance in which, after an interval of many months a swelling recurred at the same site and juice taken from it was rich in lepra bacilli. The lesion again cleared up, apparently, completely in another two months. The interest herein is twofold: first, although the swelling disappears and bacilli are no longer found, the cure is not complete and the bacilli must be latent; secondly in spite of the apparent cure immunity is not produced since the second lesion develops in a manner exactly similar to the first and runs a similar course.

H. Harold Scott.

ARAUJO (H. C. de Souza). Transmissão da lepra humana ao camundongo branco.—*Sciencia Med.* 1928. Aug. Vol. 6. No. 8. pp. 373-377. With 7 figs. on 3 plates. [10 refs.] Also in *Inst. Oswaldo Cruz., Suplemento das Memórias.* 1928. Aug. 31. No. 1. pp. 5-8.

— Sur la transmission de la lèpre humaine à la souris blanche (*Transmission of Leprosy to the White Mouse*).—*C. R. Soc. Biol.* 1928. Nov. 2. Vol. 99. No. 30. pp. 1337-1339. With 1 text fig. (Oswaldo Cruz Inst. Rio de Janeiro Brazil.)

This interesting note records the development in a white mouse of a fistula discharging acid fast bacilli 23 days after inoculation with human lepra bacilli. On sacrificing the animal a local intra-peritoneal lepra tumour and very numerous masses of acid fast bacilli

in the spleen and liver were found, showing a generalized infection. In another white mouse a leprous nodule with loss of hair over it developed after inoculation with human lepra bacilli, indicating the successful transmission of the infection.

L. R

GRECO (Nicolás V) Ensayos sobre lepra experimental (cultivos e inoculaciones) [Experimental Leprosy (Culture and Inoculation)]
—*Semana Méd* 1928. Dec. 13 Vol. 35 No. 50 (1822) pp
1629-1642. With 2 text figs. [25 refs.]

The author inoculated leproma tissue into 15 different media which he named alphabetically A to P omitting L. Those designated A and M proved best.

Medium A is prepared by mixing beef broth 1 000 glycerin 40 NaCl 5 filtered water 1 000 gm. adding two large potatoes cut up and sterilized, making the whole feebly acid filtering etc. Medium M is a modification of this: veal broth 1 000 cc. skim milk(?) (agua de ubre) 1 000 cc. glycerin (5 per cent.) 100 cc. add two potatoes cut into thick pieces, sterilize for 20 minutes at 115 C. decant, make up to 2 litres neutralize, sterilize filter etc. Medium N which was also good was made from M by addition of the yolk of five eggs incorporated in 250 cc. neutral distilled water.

In these the lepra bacilli increase in numbers. They are aerobic and retain the acid fast properties and are found in groups, the bacilli producing of a surety a substance which tends to unite or agglutinate them. No growth was obtained on solid media. Inoculation experiments of the first culture into rabbits guinea-pigs and white rats gave negative results as did also injections of the original leproma tissue.

H. Harold Scott

ABEN ATHAR (Jayme) Saprofítismo e cultivabilidade de *Mycobacterium leprae* (Nota prévia.) [*Mycobacterium leprae* as a Cultivable Saprophyte]—*Sciencia Méd* 1928 Aug. Vol. 6 No. 8 p. 378.

The author finds that the bacilli of leprosy pass in the faeces, disappear temporarily from breaking up into non-acid fast granules, and then again appear and multiply in hyaline capsules which coalesce to form a zoogloea containing acid fast granules becoming bacillary again. He suggests filtered faeces as a means of cultivating the bacillus.

H. Harold Scott.

PIERINI (Luis E.) Tratamiento de la lepra. [The Treatment of Leprosy]
—*Semana Méd* 1928 Oct. 25 Vol. 35 No. 43 (1815) pp
1122-1139 [165 refs.]

This article constitutes a sketch of the history of the treatment of leprosy and forms an interesting review.

H. Harold Scott

REEVES (I. S. H.) Leprosy.—*U.S. Nav. Med. Bull.* 1928. Oct. Vol. 28 No. 4 pp. 829-832.

This is a brief paper by a naval surgeon advocating greater use being made by his Service of the opportunities of studying leprosy during visits to tropical countries.

L. R.

- ALMEIDA (A.) Sinaes machas ou precursoras da lepra.—*Brasil-Médico* 1928 Nov. 10. Vol. 42. No. 45 pp. 1760-1771.
- VON HAMKEWITZ (Barão Ernesto) Problemas pathogenicos e terapeuticos da lepra.—*Brasil-Médico* 1928 Dec. 8. Vol. 42. No. 49 pp. 1574-1575.
- Urethritus leprosa.—*Dermat. Hoch.* 1928. Nov. 3. Vol. 87. No. 44. pp. 1709-1713.
- JEANHELME & HOKOWITZ Un cas de lépre tégumentaire anormale et prurigineuse chez un malade paludéen et porteur de microfilaires.—*Bull. Soc. française Dermat. et Syph.* 1928. July No. 7 pp. 538-549 With 3 figs. & 1 chart.
- MARKEFFE (H.) Sur deux cas de névrite aiguë du cubital au cours de la lepra.—*Bull. Soc. Path. Exot.* 1928 Nov. 14 Vol. 21. No. 9 pp. 735-737.
- NARAYANA (MURATA) & TEIRYO (TAKIYA) La Wassermann-Kaj Murata-Silberreakcio de Leproloj.—*Scientific Reports Govt. Inst. Infect. Dis. Tokyo* 1927 Vol. 6 pp. 185-186.
- & — Serodiagnosis de Lepro per metodo de komplemento kun elektrocardia.—*Scientific Reports Govt. Inst. Infect. Dis. Tokyo* 1927 Vol. 6 pp. 187-192.
- & — La Melnickoreakcia per malikarbo (Melnicko-trübungsreaktion) kaj la Murata-precipitreakcio de leproloj.—*Scientific Reports Govt. Inst. Infect. Dis. Tokyo* 1927 Vol. 6 pp. 192-193.
- & — Studoj pri la precipitarkoj de silber-lepra- kaj karcinomoj.—*Serodiagnosis de silber, lepro kaj karcinomo per precipitarkoj*.—*Scientific Reports Govt. Inst. Infect. Dis. Tokyo* 1927 Vol. 6. pp. 197-204. With 1 fig.
- MONTGOMERY (Hamilton) Report of a Case of Leprosy.—*Proc. Staff Meetings of Mayo Clinic* Rochester 1927 Aug. 17 Vol. 2. No. 23. pp. 182-183.
- SAKURAI (HOSAKI) [Pri la stato kaj kresko de leproloj].—*Japanese J. Dermat. & Urol.* 1928 Apr. Vol. 28. No. 4 pp. 432-438. With 3 text figs. [Esperanto summary pp. 4-25.] [In Japanese.]
- STILLMANN A propos d'un cas de lépre tuberculeuse observé dans le département de Meurthe-et-Moselle.—*Bull. Soc. française Dermat. et Syph.* 1928 July No. 7 (Réunion dermatologique de Nancy). pp. 515-518. [R.N. 79-83.]

REVIEWS AND NOTICES

ARAÚJO (Oscar da Silva) *Subsídios ao estudo da Framboesia Tropical*. (Bouba, Pian Yaws.) Primeira Serie. [Contribution to the Study of "Framboesia Tropical."]—141 pp. Rio de Janeiro Typ da Medicamenta, Frei Caneca, 26.

This work, which forms the first series of the author's contributions to the study of *Framboesia Tropical*, consists of five sections. In the first which is entitled, *Is Framboesia Tropical the disease referred to in the Bible under the name of Zazaath* he discusses the question whether the disease referred to in the Bible (*Leviticus Chap. XIII*) and usually regarded as leprosy was really *framboesia tropical*. The author comes to the conclusion with which the reviewer is inclined to agree that a retrospective diagnosis of this disease is impossible for it has also been interpreted as syphilis scabies eczema psoriasis or vitiligo or not an eruptive disease at all but merely a taboo.

The second section is devoted to a discussion whether *framboesia tropical* is the disease described by Arabian physicians particularly AVICENNA and HALL ABNAS under the title of *Sahafati* and contains a Portuguese translation of the poem by Francisco Lopez de Villalobos considered by Morejon as superior to Fracastor's work on syphilis. The conclusion arrived at, however is that the term was used to describe various affections of the hairy scalp but not syphilis or *framboesia tropical*.

The third section contains an account of the views of the founder of the French dermatology ALIBERT on *framboesia tropical*, as expounded in his monumental work entitled *La Clinique de l'Hôpital St Louis*. Contrary to what has been stated by some writers Alibert did not identify *framboesia* with syphilis, though he placed the two diseases in the same group but each in a distinct class the first group consisting merely of syphilis while the second embraced various diseases including *framboesia*.

The existence of *framboesia* in Brazil before its discovery at the end of the fifteenth century forms the subject of the fourth section but the conclusion is reached that the disease was not endemic but was introduced by African slaves. The last chapter consists in a refutation of the claim made by CASTELLANI and CHALMERS and other well-known writers that OVIEDO VALDEZ (1478-1557) gave a description of *framboesia*, the view held by the author being that OVIEDO's description applied to syphilis and not to *framboesia*. A bibliography of the author's contributions to literature from 1911 to date is appended.

The work, which is richly documented by numerous quotations many of which are from not easily accessible sources will be welcomed alike by the student of tropical medicine and the medical historian.

J. D. Rolleston.

HEAGERTY (John J.) [M.D. D.P.H. Department of Health Canada.] *Four Centuries of Medical History in Canada and a Sketch of the Medical History of Newfoundland*. With a Preface by A. G. DOUGHTY C.M.G. F.R.S.C. Dominion Archivist. Vol. 1 pp. xviii+395 With 14 plates. Vol. 2 pp. vii+374 With 24 plates. 1928. Bristol John Wright & Sons Ltd. London Simpkin, Marshall, Hamilton Kent & Co. Ltd. [50s.]

In *Four Centuries of Medical History in Canada and a Sketch of the Medical History of Newfoundland* Dr. John Heagerty of the Department of Health, Canada has brought together the result of much research in many different directions. The subject matter of these two volumes, considered in six parts and eighty-four chapters deals with epidemics of disease

pioneer medical men, medicine and surgery public health, medical schools, hospitals, and an appendix contains the sketch of the History of Medicine in Newfoundland mentioned in the title. The first 220 pages in Volume I are devoted to the epidemics of scurvy small-pox among the Indians and among the early settlers, yellow fever (mal de Siam) plague ship fever, mal de la baie St. Paul, leprosy cholera and influenza. In 1773 attention was first called to the peculiar disease, traditionally ascribed to the arrival of a detachment of Scottish troops, but also called "mal anglois" and "la maladie allemande." Beginning with oral pustules the disease subsequently behaved like syphilis and could be cut short by mercury so that it was regarded as syphilis, though children formed a large proportion of the infected, and it was often extragenital in origin. The occasions on which yellow fever has been introduced into Canada, mainly in Quebec, are critically considered and though outbreaks have been quoted as occurring in Quebec in 1805 and at Halifax in 1861 the author has not found any record of them but he admits that, though most of the cases of ship fever were typhus some of them may have been yellow jack. The first epidemic of typhus in Canada was in 1859 and was introduced by French immigrants. The epidemic in 1847 among Irish and English immigrants at the Quarantine Station in Grosse Ile was an appalling tragedy. In the seventeenth century small-pox ravaged the Indians who came in contact with the whites, and as a result the Jesuits were suspected of witchcraft by the natives, who naturally tried to get their revenge. Inoculation was introduced about 1768 by an army surgeon called Latham, and vaccination by John Church, a friend of Jenner's as early as 1798, the year of the publication of the "Inquiry into the Cause and Effects of the Variolae Vaccinae." Small-pox still takes its toll of the red men of North America and as lately as 1835 there were anti vaccination riots in Montreal. As far as is known leprosy first appeared in 1815 in New Brunswick, and from then until 1924 there have been 319 lepers admitted to the Larrette chiefly from districts where it has long been endemic in New Brunswick. In spite of cholera gained entrance into Canada in 1832 and, starting in Quebec, where there were nearly four thousand deaths, passed through the Dominion. The epidemics of influenza since 1900 are related though the constant presence of small-pox and the occasional epidemics of cholera and typhus seem to have deprived it of much attention. It is interesting to note that before the advent of the French the Indians had few diseases, scurvy and eye affections due to the irritation of smoke in their chimney-less houses being the commonest whereas the infectious, venereal disease and possibly tuberculosis were importations.

Humphry Rolleston.

CABANÈS. Esculape chez les artistes. [Aesculapins in Art].—401 pp. With 196 figs. & 1 plate. 1923. Paris. Librairie Le François, Boulevard Saint-Germain 91.

A melancholy interest attaches to this book, the last to be published in his lifetime by Dr. Cabanès who recently died at the relatively early age of 60 after a life devoted to research in the bypaths of medical history and the illustration of the relations of medicine to literature and art.

The object of the present work, as we learn from the preface is to prove the falsity of the view that an antagonism exists between Science and Art. Many great artists such as Leonardo da Vinci, Michael Angelo, Cellini and Titian, on the one hand were men of science and eminent men of science, on the other such as Pasteur and Charcot were artists of considerable merit.

In the first chapter which deals with deformities of the face and other anomalies of this region, special attention may be drawn to Peruvian vase

of the period of the Incas in one of which the figure presents the characteristic facial lesions of leishmaniasis while in another the lesions of blastomycosis are portrayed

After chapters on deformities of the neck, spine and abdomen and the subjects of goitre obesity dwarfism and blindness as represented in art we come to that which will be of most interest to our readers entitled *Great epidemics in History and Art*, wherein the author deals successively with plague leprosy syphilis and small pox the history of which he illustrates from contemporary panels, engravings and pictures

Special attention is given to St. Roch the patron saint of the plague stricken, who was born at Montpellier at the end of the thirteenth century and spent 20 years of his life nursing the victims of plague

It is noteworthy that Jacques Daviel who invented the operation of extraction of the lens for cataract, was one of the medical officers specially appointed to visit plague patients in the middle of the eighteenth century

The history of leprosy is illustrated by pictures of St. Elizabeth of Hungary Edward the Confessor and St. Francis of Assisi whose devotion to the lepers was a favourite subject for Albrecht Durer Hans Holbein and other early painters

The next three chapters which are illustrated by the work of Teniers Sodoma, Rubens and Goya will be chiefly of interest to the neurologist and psychiatrist as they are concerned with the representation in art of demoniacal possession hysteria insanity and epilepsy

The following chapter on surgery in art in which the author acknowledges his indebtedness to Professor Paul Lecène's work on the evolution of surgery contains passages illustrating the history of phlebotomy and other minor operations including the surgical fiction of extraction of stones from the scalp which was so favourite a subject with the Dutch painters

The remaining chapters deal with the portrayal of chiropodists, dentists and uroscopists and great medical discoveries among which vaccination holds the foremost place

In an appendix enlargement of the thyroid gland is illustrated by the pictures of Flemish, Dutch and German artists such as Memling van Eyck Rubens van der Weyden and Holbein, to mention the best known.

This book like most of the author's other works will be read with enjoyment by all those interested in the history of medicine and antiquarian research

J. D. Rolleston

Cook (Cecil) [M.B. Ch.M. (Syd.) D.T.M.&H. Wandsworth Research Scholar] *The Epidemiology of Leprosy in Australia. Being the Report of an Investigation in Australia during the Years 1923-1925 under the Terms of the Wandsworth Research Scholarship of the London School of Tropical Medicine.—Commonwealth of Australia Department of Health Service Publication Number 38 303 pp With 16 figs. (5 maps) 1927 Canberra.*

This publication forms the Report of an investigation in Australia during the years 1923-1925 under the terms of the Wandsworth Research Scholarship of the London School of Tropical Medicine and presents for the first time as we learn from Dr. CUMSTON'S preface a complete record of the known facts relating to leprosy in Australia

After an introduction in which the scope of the enquiry is set forth the author successively considers the occurrence of leprosy in the various divisions of the Commonwealth viz. the Northern Territory Western Australia, Queensland New South Wales and Victoria

It is shown that leprosy was unknown among the aborigines and early European settlers but was introduced by coloured labourers from China and the Pacific Islands subsequent to the discovery of gold in the early

fifties of the nineteenth century. The differences in the distribution of the disease in the various states are to be attributed to local variations in racial, social and climatic factors determining endemicity.

Infection in aliens was transmitted to the aborigines, among whom it became endemic, but it was only where Europeans lived in intimate association with the aborigines that infection was spread from natives to whites.

The recommendations made by the author for dealing with the situation, particularly in Queensland where leprosy is most prevalent, are as follows—

(1) Strict isolation of the lepers in a remote district but with attractive surroundings to promote contentment and discourage attempts at escape.

(2) Regular re-examination.

(3) Intensive treatment.

It is particularly important that the leper patient should be kept away from the aborigines, who are extremely susceptible to infection.

An appendix contains the Queensland Leprosy Act of 1892.

The report is illustrated by coloured maps of the various states showing the endemic areas of leprosy at the present day and in past times.

J. D. Rolleston.

WALL (F.) [Colonel, I.M.S. C.M.G. K.H.S. C.M.Z.S.] *The Poisonous Terrestrial Snakes of our British Indian Dominions (including Ceylon) and how to recognize them. With Symptoms of Snake Poisoning and Treatment.*—pp. x+173. With 40 text figs. Fourth Edition. 1928. Bombay. Published by the Bombay Natural History Society. [Rs. 4 8s.]

In form and style this edition differs little from its predecessor reviewed in this *Bulletin* in 1914 (Vol. 3 p. 62) but a few improved figures have been substituted in Part I which deals very adequately with the identification of the individual species of Indian Elapine and Viperid snakes and by some additions and modifications in Parts II and III, which treat respectively of snake-bite and its effects and with methods of treatment, the author naturally has aimed at bringing the book up-to-date. Selected cases of snake-bite illustrating severally the effects, and their symptoms, of the venoms of the common dangerous species remain a vivid and serviceable feature of Part II. In the discussion of treatment (Part III) the use of the ligature (even of a well-applied rubber band) is slighted, the local injection of permanganate undervalued, and of gold chloride decried.

These local measures of course, are not supposed to have any effect unless they are applied promptly but when employed without delay they may reasonably be expected at least to check and restrict absorption of venom and so to facilitate the action of antivenoms, or—if these are not at hand—to give time for the employment of useful symptomatic remedies. They may indeed do much more. Since ACTON and KNOWLES showed, in 1914 in their carefully controlled experimental *Studies in the Treatment of Snake Bites* (see this *Bulletin*, Vol. 9 pp. 237-241) that ligature alone, if applied at once could save animals (rabbits) that had received lethal doses of Russell's viper venom—that the immediate local injection of 10 cc. of a 5 per cent. solution of a permanganate (K, Ca, Zn) could save monkeys that had received more than fatal doses of cobra and viper venom—and that a monkey which had received 25 lethal doses of cobra venom recovered from the effects without any further treatment than the application, within 3 minutes of a ligature (rubber tubing) followed by the injection, within 25 minutes, of 10 cc. of a 5 per cent. solution of gold chloride. Of this fine experimental work, so confirmatory of general experience, no recognition is to be found in the present volume. The author seems also to have overlooked several papers published in recent years that support the original conclusion of CALAGUTTA, that snake antivenoms are not so rigidly specific in quality and scope as we have since been taught to believe.

A. Alcock.

TROPICAL DISEASES
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BERIBERI

LOPEZ RIZAL (Leoncio) *Report of the Committee on Beriberi.—Jl Philippine Islands Med Assoc 1928 Oct Vol. 8 No 10 pp 422-438*

Beriberi is a prevalent disease in the Philippines. In the year 1910 the mortality from the disease was 1 441 in Manila and 4 128 in the Provinces while in 1926 there were 526 deaths in Manila and 18 678 in the Provinces. In 1926 a Committee was formed to deal with various aspects of beriberi following the recommendation of the Far Eastern Association of Tropical Medicine. The following are some of the more important of its findings.—The disease is widely distributed through the Islands chiefly among the poorer classes but the mortality varies greatly. It is prevalent during the last three months of the year and in January. Beriberi incidence and the local production of rice have both increased since 1910. Rices examined by staining with Gram's iodine solution having 50 per cent or more of the external layer do not produce polyneuritis in pigeons and such rices may prevent beriberi.

As regards the chemical standardization of rice it was found that amido-nitrogen is useless as an index. 1.05 per cent ash is a poor index. 0.62 per cent P_2O_5 content is better and 1.28 per cent fat is the best. Rice having 1.77 per cent P_2O_5 plus fat but not less than 0.4 per cent P_2O_5 content or rice having not less than 0.62 per cent P_2O_5 or rice having not less than 0.50 per cent P_2O_5 and with at least 75 per cent of the external layers has been proven to be a beriberi preventing rice for pigeons. These percentages excluded only 9 rices out of 200 that afforded protection to pigeons.

The chief causes of the deterioration of stored rice are damp and insects. Undermilled rice deteriorates more rapidly than the overmilled variety. The different methods of preparing rice for food alter the P_2O_5 content and presumably the vitamin content also.

The diet of beriberi families investigated was found to be varied but insufficient owing to poverty.

Certain recommendations naturally suggest themselves as a result of these investigations. Chief among these are that the milling of rice should be carried out to the degree of safety mentioned above that the growing of vitamin-rich vegetables should be encouraged and that the campaign of education in beriberi-preventive methods should be continued.

A. Douglas Bigland.

SHATTUCK (George C.) The Relation of Beri-Beri to Polyneuritis from Other Causes.—*J. or JI Trop Med* 1928. Nov. Vol. 8. No. 6. pp. 539-543 [10 refs.] [Harvard Med School, Boston, Mass.]

It is not possible either in the laboratory or at the autopsy table to demonstrate a conclusive criterion of beriberi. Many cases, therefore, must be missed even by workers familiar with the disease. Where beriberi is endemic polyneuritis may be due to other diseases such as diabetes, tuberculosis, cancer or syphilis. Even where the polyneuritis is associated with circulatory disorders and cardiac enlargement the diagnosis, though probable is by no means certain. Such a polyneuritis occurring during the course of chronic malaria provides an example of the difficulty. Nevertheless the author is of the opinion that beriberi may be a "possible provisional diagnosis" whenever polyneuritis occurs in patients who have lived upon a restricted or unbalanced diet or been subjected to marked debilitating influences.

Beriberi in the U.S.A. is apparently rare but is seen occasionally in imported cases. The disease has been described in Louisiana, Newfoundland and among fishermen on the Grand Banks. One probable case has been reported in a coloured woman living in Philadelphia. Nevertheless a polyneuritis occurring in such conditions as chronic alcoholism, diabetes, cancer, tuberculosis, syphilis, pregnancy and the marasmus of infants may not be due to these conditions, but rather to an associated avitaminosis. In short some might be cases of true beriberi. Arguments by analogy with pellagra are brought forward in support of this hypothesis.

It seems reasonable to suspect the existence of beriberi wherever pellagra and scurvy are found because all three diseases develop on a basis of faulty nutrition and because beriberi probably may be combined with either pellagra or scurvy.

A D B

TRAHAUD (J.) L'avitaminose suffit-elle à expliquer le béri-béri humain. Does Avitaminosis explain Human Beriberi?—*Bull. Acad. Méd.* 1929 Jan. 8. Year 93 3rd Ser. Vol. 101 No. 1 pp. 47-51

The author asks himself whether avitaminosis alone is sufficient to explain human beriberi. Apparently doubts upon this point occurred to him after observing cases of the disease during the war on the Italian Front and at Marseilles together with those seen in Syria in 1924 and isolated cases which have since been noted in Damascus.

Particulars of the cases in Syria are as follows. From May to September 1924 five cases of dry beriberi among Indo-Chinese Troops from Beirouth were found. These men had been in the Levant for more than a year and had never suffered from the disease in their country of origin. Their food, though containing 550 grams of polished rice per day was supplemented by bread, meat, green vegetables and fruit. Just at the time when the last two of these cases were recovering there were admitted to hospital (presumably at Damascus) 20 Senegalese in groups of four or five. These presented typical "wet" beriberi symptoms, and two died suddenly. Another Senegalese died suddenly in the Alexandretta Hospital of a similar condition and three other cases of like nature were evacuated to Aleppo. Cases were also observed in Tripoli.

It was found that all these Senegalese belonged to one reinforcement which had arrived some months previously. All had been recruited in the same district of the Soudan where beriberi was unknown and the diet generous and varied, and not containing rice. During the journey to Marseilles (March to July) rice was the basal diet. On August 5th less than a month after their arrival in Syria beriberi broke out and attacked 50 per cent of the troops. The author points out that at Dakar at Marseilles and on the voyage to Syria and in Syria itself the diet had been sufficiently varied. Also in the cases mentioned in the first part of this paper though the diet contained 500-550 grams of rice per day it was richly supplemented so that the ration was nearly equal to that of the white troops as might be expected when living in a country noted for its fruits and vegetables and in a garrison town where restaurants were plentiful.

The author further shows that during each year three or four sporadic cases of beriberi among black troops are admitted to the hospital at Damascus. The daily ration of these troops is given in a table and it is difficult to understand how avitaminosis could have occurred.

Reviewing all the cases it is admitted that rice does play a part in the causation of the disease since the condition began when rice was eaten and when it was removed a cure was brought about. Nevertheless it is suggested that the action of the rice is a toxic one and the absence of fever in beriberi cases together with the similarity of the neuritis to that found associated with lead and alcohol are supposed to support this view. Avitaminosis may prepare the way for the action of the toxic substance.

A. D. B.

TULL (J. C.) **Gross and Histological Changes in the Gall-Bladder in Beriberi.**—*Trans Roy Soc Trop Med & Hyg* 1928 Nov 25 Vol 22 No 3 pp 285-287 With 2 figs on 1 plate. [Path Clinic Singapore.]

This research is based upon a study of 270 autopsies on frank cases of beriberi occurring in Singapore. The gall bladder was constantly found to present certain appearances which may be regarded as typical of the disease. The organ appeared large, tense, glistening and of a distinctly yellowish green colour. Adhesions to the under surface of the liver were constantly present. On opening the gall bladder very little bile was found and the enlargement was seen to be due to thickening of the wall, in one case reaching half an inch. No gall stones were found.

The external surface of the gall bladder presented a honeycombed appearance and on section the layers shrank away from each other. The coats seemed to be separated by a coagulable gelatinous material most marked between the serous and muscular coats and in the serosa itself. Similar changes though less marked were found in the cystic duct and common bile duct and very much less in the hepatic ducts.

This oedematous condition of the gall bladder is met with even when no oedema occurs elsewhere in the body and is as characteristic of beriberi as are the cardiac changes.

Microscopically the presence of the amorphous gelatinous substance was noted, but there was no evidence of an acute inflammatory reaction and no organisms have been found constantly. The author has

discussed these findings with Professor WEXCKERBACH of Vienna, and the conclusion is reached that the pathology is similar to that met with in the beriberi heart and is due to water retention.

A. D. B.

WEXCKERBACH (K. F.) & AALSMER (W. C.) On the Nature of Cardiac Affection in Beriberi Patients.—*Proc. Roy. Acad. Amsterdam*. 1928. Vol. 31. No. 6. pp. 656-659.

Certain points in the authors' well-known views upon the cardiac pathology of beriberi are again stressed. The typical features are increase in thickness of the cardiac wall, normal E.C.G. findings as regards excitability and conduction and the therapeutic failure of heart tonics as compared with the immediate good results from vitamin B administration.

Arguments are put forward in proof of the contention that the cardiac enlargement is not due to hypertrophy of the muscle but to retention of water. Treatment must therefore be directed to the removal of this water retention. Digitalis might be expected to fail in this respect, but it is remarkable that diuretics such as novasurol and salyrgan have no effect. The wonderful and rapid improvement under vitamin B administration suggests that the muscular swelling is due to a specific cause. The probability is that the changes in the peripheral and central nervous system are due to the same cause *viz.*, water retention.

A short discussion of "heart hormones" and "automatins" is given and the paper terminates with these words regarding the therapy of the beriberi heart: "The added active substance should, therefore, not be called automatins: what takes place in the heart is not a resuscitation from the sleep of death, but the deliverance of a fettered prisoner."

A. D. B.

TUXFORD (A. S.) Heart Failure in Beri-Beri. [Correspondence].—*Lancet*. 1928. Nov. 3. p. 948.

The writer of this letter expresses his whole-hearted agreement with Professor WEXCKERBACH's views as to the heart condition in beriberi [see this *Bulletin* Vol. 25 pp. 871-2]. His experience in British North Borneo confirms the uselessness of digitalis as a heart tonic in these cases. The beneficial results obtained from daily large doses of magnesium sulphate point to the truth of the water retention hypothesis. He points out that this line of treatment together with one ounce doses of ordinary yeast three times a day and a diet in which the rice is mixed with green peas (*katjang idjoe*) and other vitamin B foods such as marmite will make a beriberi case fit for work in three weeks. When fresh yeast cannot be obtained dry yeast spores in the form of pills may be given up to 30 grains daily.

A useful guide to the prognosis of a beriberi case is obtained from dynamometric measurements of the hand grip. On admission to hospital the grip does not usually exceed 30 kgm. but after treatment with yeast readings of 60 to 80 kgm. may be obtained at the end of a fortnight.

A. D. B.

YAMAGUCHI (Tomotaka) Studien ueber Flussigkeitsaustausch. VII Intermediärer Flüssigkeitsanstauch bei Beriberi und experimenteller menschlicher B-Avitaminose (Ein Beitrag zur Frage der Entstehungsweise des Beriberiödems.) [*Fluid Exchange in Beriberi and Human B Avitaminosis.*—*Tohoku Ji Experim Med* 1928 May 15 Vol 10 No 5 pp 435-465 With 5 text figs

Experiments were designed to show the effect of temporary pressure on the arm in cases of true beriberi. All three types of the disease viz. the dropsical, the sensori motor and the cardiac were examined including also cases of experimental human B avitaminosis. The experiments were conducted as follows: a rubber band was applied to the upper arm and after a quarter of an hour blood was removed from the constricted arm and also from the other for purposes of control. The control arm was then allowed to hang down vertically (apparently without a bandage) and blood was taken from it after half an hour. A bandage was then applied and after a further quarter of an hour another sample of blood was taken.

In true cases of beriberi the blood from the constricted arm after a quarter of an hour showed a drop in the haemoglobin content. The serum protein content was also lessened, but to a proportionately less extent. In venous stasis after half an hour both serum protein and haemoglobin content are increased, but the former to a less degree than the latter. After application of the bandage both drop below normal. In experimental B avitaminosis cases the results were very much the same as those in sensori-motor beriberi (in the cardiac form of the disease the serum protein shows a continuous increase throughout the second experiment). The sodium chloride content of the blood remains the same during the whole time.

Congestion oedema in the arm is greater and lasts longer and the capillary wall is more permeable to protein in cases of beriberi than in normal subjects.

From these experiments the author concludes that the oedema of beriberi is of non-renal origin and in all cases whether oedema is present or not the fluid exchange factors are pathologically changed and this phenomenon persists for some time even after recovery from all symptoms of the disease has taken place.

A D B

MEGAW (J W D) BHATTACHARJI (S P) & PAUL (B K) Further Observations on the Epidemic Dropsy Form of Beri Beri.—*Indian Med Gaz.* 1928 Aug Vol. 63 No 8. pp 417-439 With 7 maps & 6 charts in text.

The paper is divided into two parts.

Part 1 comprises a review of the whole subject of epidemic dropsy and more particularly of the relationship between this condition and beriberi. While it is held by most workers that epidemic dropsy is a form of beriberi the latter condition is not a clinical entity and, moreover is as yet of unknown etiology. The neuritic type of beriberi is undoubtedly due to B avitaminosis but the etiology of the cardiac and wet forms is by no means certain. Three main hypotheses have been put forward to explain the causation of both conditions.

viz. infection, food poisoning and vitamin deficiency. Other similarities between the two diseases may be summarized as follows: (1) Both are essentially diseases of rice eaters. (2) In India the geographical distribution of both dovetail into one another exactly. (3) the seasonal incidence of both is very similar. (4) the frequency of family and place outbreaks in both. (5) the age incidence (excepting infantile beriberi).

The differences between the two are: (1) Beriberi occurs chiefly among those who eat over milled rice, while epidemic dropsy usually attacks those living on parboiled or under-milled rice. (2) Gastro-intestinal symptoms with fever and a vaso-motor rash are commoner in epidemic dropsy and neuritic signs in beriberi. (3) Glaucoma is frequent in the later stages of epidemic dropsy but is not found in beriberi. (4) Epidemic dropsy has no infantile form.

Tables are given showing the relative frequency of the symptoms and the numerous etiological hypotheses.

Part 2. Contains many tables, charts and maps dealing with the various outbreaks of epidemic dropsy in Bengal during the period 1925 to 1927. Analysing the facts obtained from these epidemics the authors are of the opinion that the cause of the disease is the faulty storage of rice which renders the grain poisonous. Mustard oil cannot be blamed as a causative agent as this factor can be excluded in many cases. It is impossible to believe that the disease could be caused by a deficiency of vitamin B. The explosiveness and the nature of the symptoms in themselves are enough to exclude this theory. The evidence is strongly against person-to-person infection.

Holding the view that epidemic dropsy is a disease due to poisons developing in rice owing to faulty storage the authors lay down the following two rules for the prevention of the disease —

(1) "Epidemic dropsy can be controlled by the use of rice which has been properly stored at every stage after harvesting.

(2) The diets of all persons should contain sufficient quantities of all the nutritional elements, including the necessary vitamins.

A. D. B.

GHOSH (G.). An Outbreak of Epidemic Dropsy in Allahabad in 1927 (February to April).—*Indian Med. Gaz.* 1928, Oct. Vol. 63, No. 10 pp 562-565

The Allahabad outbreak of epidemic dropsy began in February 1927 with a few indigenous cases. Immediately the author warned the people in the local press to stop eating rice, particularly the parboiled milled variety. Nevertheless, the number of cases increased, reaching a maximum in April. By the end of May no further cases were reported.

The author's findings in this epidemic are as follows. Most of the cases occurred in Bengalese, a few were Anglo-Indians and Kashmiris, but all these were partial to rice. Those Bengalese who ceased taking rice or changed to the local hand-milled variety escaped the disease. The chief brunt of the epidemic fell upon those who bought rice from one particular grain market.

The age incidence of the disease varied from 8 to 65 years, and no babies or small children were affected. The most constant clinical features were gastro-intestinal disturbances, oedema (including effusions into serous cavities in a few cases) dilatation of the heart the fatal

cases dying of cardiac failure with pronounced dyspnoea. Slight fever, haemorrhages from various organs, tenderness of the calf muscles and glaucoma (one case) were noted.

A D B

KAMATH (A. V.) Report on the Investigation of an Outbreak of Epidemic Dropsy in Surada, a Village in Ganjam District.—*Indian Med Ga.* 1928. Oct. Vol. 63. No. 10. pp. 555-562.

Together with two other villages Surada forms the Union of Surada with a total population of about 4 000. An outbreak of epidemic dropsy occurred and attempts were made to ascertain when the disease first started in the village. According to a local midwife the disease began 19 years previously but the first official record dates from 1924 and a special report in 1925 recorded nine cases. Till recently the disease was practically confined to one street of the village and 75 per cent. of the cases in the present epidemic were traced to dhobi families in this street or to a woman and her son who kept an hotel near by.

The clinical findings include the following: Oedema of the legs, gastro-intestinal symptoms, fever in a few cases, dilatation of the heart in only three cases, anaemia and haemorrhages. The renal, nervous and respiratory systems showed no symptoms of note. The age incidence was apparently 4-60 years and the sexes were equally affected. The effects of the disease were slight in about 90 per cent. of the cases and work was not interrupted. A few mild cases cleared up in 15 days but the more severe ones, with dysenteric diarrhoea and moderate oedema, lasted over four months. The average duration was about three months. Out of 102 cases six died.

Except for the poorness of the rice harvest in the year of the epidemic which necessitated the use of ragi gruel instead of rice gruel in the mornings there was no alteration in the diet of the village. For this and other reasons the author is opposed to the food deficiency theory of causation. The disease in the majority of cases, was distinctly traced from one or two foci in the village and it would appear that some infective agent was present. It is not clear how the infection was spread. The water supply could not be blamed and the bed bug was not the carrier. Food seemed to be the most important means of spread, but the nature of the infecting organism could not be determined. There is no immunity set up to the disease and, in fact, attacks are prone to occur in subsequent years in the same individuals. Treatment consisted of good nourishing food, disinfection of excreta, etc., and the exhibition of digitalis with potassium iodide.

The Editor of the *Indian Medical Gazette* appends a note in which he points out that many of the patients obtained diseased rice from a common source, and in the others, though home-grown rice was used, it is not clear whether this was the only variety eaten.

A D B

FERRUCCIO (Cotta Ramusino). Contributo allo studio del beri beri.—*Arch. Ital. Sci. Med. Colon* 1928. Sept. Vol. 9. No. 9. pp. 551-559.

PELLAGRA.

GOLDBERGER (Joseph) WHEELER (G. A.) SYDENSTRICKER (Edgar) & KING (Wilford L.) & Others. *A Study of Endemic Pellagra in Some Cotton-Mill Villages of South Carolina. An Abstract.—Public Health Rep* 1928. Oct 12 Vol. 43 No. 41 pp. 2645-2647 [1 ref.]

Field investigations of pellagra were begun in South Carolina in the spring of 1916. Seven villages of the cotton-mill type were first observed, but throughout 1917 the number was increased to 24. Later again the number dropped to about the initial figure. The following results were obtained. During 1917 1 147 cases of pellagra were observed, an incidence of 50.6 per 1 000 population. Of 4,104 household 18.5 per cent had at least one member affected. The fatality rate of the endemic disease did not appear to exceed 3 per cent. It was also found that the disease in an endemic locality is from two to six times more prevalent than local medical opinion suggests. A preponderance of pellagra incidence was noted in children from 2-15 years of age. Single women were relatively exempt from the disease possibly owing to the fact that they are wage earners. 80-90 per cent. of all cases began between April and July (inclusive) and this can be correlated with seasonal variations in food supply. The continuous study of a selected village during a period of nearly six years demonstrated that year to year fluctuations of pellagra incidence are intimately associated with fluctuations in economic conditions. Sanitary conditions did not appear to influence the incidence of the disease.

A. Douglas Bigland.

DEARMAN (W. A.) *Pellagra.—Southern Med J* 1928. Sept Vol. 21 No. 9 pp 713-714

This paper was read before the Gastro-enterology section of the Southern Medical Association, U.S.A. in November 1927. The following points may be noted. Importance is attached to the role of unbalanced diet in the causation of pellagra. The disease is not on the increase in the Southern States and no fear need be entertained of an outbreak in the flooded area. A table is given showing that the proportion of pellagra cases in the black population as opposed to the white is approximately 2:1 and the proportion of deaths approximately 4:1. These differences are due to lack of intelligence and faulty hygiene in the negro population. The treatment of pellagra is reviewed and the importance of diet and vitamins is emphasized.

The paper ends with an extract from a letter written to the author by a medical colleague. In the bright hereafter when all the benefits and all the beneficial agents of all the ages are gathered up and condensed into globules of transcendent ecstasy I doubt whether there will be anything half so beneficial to the human race from the cradle to the grave as the grand old Jersey cow America's greatest asset."

A. D. B.

MACHWILADSE (Niko) Ueber die Endemie der Pellagra in Georgien [Pellagra Endemie in Georgia (Caucasus)]—*Arch f Schiffs u Trop Hyg* 1929 Jan Vol 33 No 1 pp 18-24 With 1 text fig [11 refs] [Med Clinic, Georgia State Univ Tiflis]

During the years 1919-1925 75 cases of pellagra were observed among the peasants living in villages of West Georgia (Caucasus) The age incidence of the disease was greatest between 30 and 45 years Children were affected in some instances but the disease was never seen in sucklings Of the 75 cases 55 were males and 20 females. The condition was graded as 53 chronic 17 sub-chronic and mild and 5 sub-chronic and severe No cases of the acute type nor of pellagra without skin manifestations were observed. Exacerbations of the disease occurred as usual in the spring and many of the older patients said that their disease began in childhood.

The clinical appearances were characteristic viz dermatitis diarrhoea, etc. In addition to the soreness of the tongue salivation was noticed in some instances and in one case 200-250 cc. of saliva were collected every day There was no pyrexia, the blood pressure was low and in some cases even in young subjects emphysema was noticed Examination of the nervous system revealed variability of the reflexes weakness of the legs and asynergia of the arms in those cases investigated the blood and spinal fluid were normal The following mental changes were noted—weakness of memory melancholia quite often slowness in answering questions and dementia in two cases.

Laboratory investigations revealed in most instances a lessened total acidity of the gastric juice and achlorhydria. The chief change in the urine was an increase in volume and in eight cases diacetic acid was present The stools contained parasites in 45 cases. The number of red blood corpuscles and the haemoglobin content of the blood were lessened, as also were the leucocytes and platelets. There was a relative lymphocytosis and the colour index was high The viscosity was increased in all of the six cases examined this may be accounted for by the fact that they all had diarrhoea. The fragility of the red corpuscles was found to be increased.

Georgia is a farming country the eastern district of which is fertile and the people therefore prosperous. Here pellagra is very rare But in the western district along the coast of the Black Sea the land is poor and the people live chiefly on maize bread and vegetables. The only fat is obtained from walnuts while meat and milk products are rarely eaten The maize is well stored and does not deteriorate.

The author summarizes his paper by stating that pellagra is endemic in Georgia and is practically confined to those districts in which food is deficient The probable cause of the disease is a one-sided vegetable diet

A D B

v. POór (F) Pellagrafälle in Südungarn [Pellagra in S. Hungary]—*Dermat Hoch* 1928 May 5 Vol 86, No 18. pp 600-604 With 2 text figs [3 refs] [Skin & V.D Clinic Franz Joseph Univ Szegedin.]

The first case of pellagra in South Hungary was described in 1889 The disease must have been rare up to 1923 as the author never saw the condition prior to that date In the next four years however some ten cases were recognized by him

One case having typical appearances, is described at some length and the others are said to be similar. Much attention is given to the skin lesions and one case showing an almost universal leucoderma is described. The only psychic disturbances noted were senile dementia and neurasthenia. With one exception the cases were found among the poorer classes.

As regards diet it appears that maize bread was eaten in the district during the war but later ordinary bread was obtainable, and it was considerably after this that pellagra appeared. Also maize bread is eaten in Budapest but no pellagra is reported in that city. The author finds no relationship between the disease and the consumption of alcohol. In his opinion unknown toxins endogenous or exogenous, not associated with maize whether fresh or spoiled, sensitize the organism to the effects of light.

A. D. B.

CARLEY (Paul S.) A Case of Pellagra following Voluntary Reduction of Diet.—*Jl Amer Med Assoc* 1928. Sept. 22. Vol. 91. No. 12. p. 879

A case of pellagra occurring in a white woman aged 33 is here described. The chief interest lies in the fact that the onset of the disease was closely associated with a period of voluntary and considerable reduction in her diet.

In 1921 when she was aged 27 years indigestion was first experienced. This continued till the autumn of 1922 when she decided to restrict her diet. A cyst was removed from the ovary and the surgeon ordered a return to full diet with disappearance of the symptoms. In the latter part of 1926 the abdominal distress returned, and fearing carcinoma she again reduced her diet so that early in December 1927 she was living largely on cooked cereals with no milk, vegetables, meat or eggs. About December 10th 1927 she began to show signs of pellagra, viz dermatitis of the hands and soreness of the tongue.

Treatment consisted first in reassuring the patient that she was not suffering from carcinoma, and secondly in giving 1 lb of canned tomatoes and 1 qt of cow's milk daily in addition to an ordinary diet. Two ounces of dried brewer's yeast was taken in water (divided into three doses) daily.

Following this regime the dermatitis disappeared in 15 days, and by June 26th, 1928, the tongue condition had cleared up and she had gained 5 lbs. in weight. Her physical condition continued to improve and Dr GOLDBERGER, seeing the case in July 1928 could find no signs of pellagra.

A. D. B.

BALLIF (L.) & GHIESCOVICI (I.) Le pH du plasma sanguin et du liquide céphalo-rachidien dans la pellagre [The pH of Blood Plasma and C.S.F. in Pellagra].—*C R Soc Biol* 1928. Oct. 19. Vol. 99. No. 28. pp. 1187-1188 [5 refs.]

The pH values found in the blood and cerebro-spinal fluid in acute and chronic pellagra are here given. The method employed was the colorimetric one of Cullen and Guillaumin. The cases examined comprised 20 acute pellagrins, 10 chronic pellagrins and 30 mental cases as controls.

In acute cases of pellagra the plasma showed a pH value of 7.27 as compared with the figure 7.34 in chronic cases and controls. The alkaline reserve gave a figure of 49 for the acute cases 54 for chronic and 60 for controls. In some cases showing a grave acidosis insulin (5-20 units a day) was administered without appreciable result. In spite of a high blood calcium figure all the cases presented extreme neuro-muscular excitability.

As regards the spinal fluid, difficulty was experienced since the normal figure is not agreed upon by all workers. In this paper a pH value of 7.21 is regarded as normal in the spinal fluid with the alkaline reserve 46.22 and calcium 27. In severe cases of pellagra the fluid gave the values pH=7.17 alkaline reserve 60 and calcium 37.1.

A. D. B.

SALMON (W. D.) HAYS (I. M.) & GUERRANT (N. B.) *Etiology of Dermatitis of Experimental Pellagra in Rats.*—*Jl Infect Dis* 1928 Nov Vol 43 No 5 pp 426-441 With 8 text figs. [8 refs.] [Lab of Animal Nutrition Alabama Polytechnic Inst Auburn Ala.] [Summary appears also in *Bulletin of Hygiene*]

In 1928 GOLDBERGER and LILLIE by feeding rats upon a diet of casein, salt mixture, cod liver oil, vegetable fat and corn-starch, supplemented by a vitamin B extract were able to produce a pellagra-like condition. Later workers have obtained similar results. Having pointed out that the external signs of experimental pellagra in the rat are alopecia, dermatitis, stomatitis, ophthalmia, arthritis and usually cachexia, the authors summarize their work as follows—

The internal lesions of advanced cases are haemorrhagic gastro-enteritis, atrophy of the spleen, fatty infiltration or degeneration of the liver, cloudy swelling of the kidneys and often cystitis. There is a relation between the character of the diet and the occurrence of the syndrome. A mild dermatitis has been found among mature rats receiving a diet which is adequate for excellent growth and reproduction. The severe form has been produced only on restricted diets.

A gram positive coccus has been found constantly associated with the disease. This organism has been isolated (often in pure culture) from skin lesions, arthritic lesions, parenchymatous organs, and walls of the intestines of pellagrous rats. With two exceptions the organism has not been obtained from the blood stream. The organism has been fed to rats and the characteristic lesions from which the organism has been recovered have been produced.

Concentrates of a protective principle (P.P. factor) which cure or prevent the occurrence of the disease have been prepared from *Pueraria bergiana* [Leguminosae]. A relatively low concentration of these preparations in nutrient broth inhibits the growth of the causative organism.

A. D. B.

HUERTAS (Francisco) *La pelagra.*—*Siglo XIX* 1928 Oct. 20 Year 75 Vol. 82, No 3906 pp 379-381
 SILVA (Flaviano) *Síndrome pelagroso.*—*Ann Brasileiros Dermat. e Syph* 1928 Vol 4 No 2 pp 13-17

MALARIA

CHRISTOPHERS (S. R.) SIXTON (J. A.) & COVELL (G.) *How to do a Malaria Survey*—*Health Bull. No. 13 Malaria Bureau No. 6*
Calcutta 1928. pp. iv+147 With 11 plates. [As. 8 or 10d.]

A book of 150 pages, a price of 10d. and a quality of contents difficult to surpass. A malaria survey, it is noted, sets out to elucidate the facts in some particular place. It must form the first step in any campaign, and the criterion by which the effect of action taken is judged. It gives opportunity for constructive work on malaria epidemiology based on precise measured data and: perhaps what is most needed at present to widen knowledge. The paper gives a detailed list of the field apparatus and laboratory equipment in which one may trace the results of Christopher's long practical experience. To mapping, collection, and breeding-out and dissecting of anopheles the same applies. A valuable illustrated chapter deals with the structure of the ovary and development of the ova in the female anopheles, and shows how important differences in these may be in determining the insect's age—a matter needing further investigation for apparently she will waste her egg if she cannot reach her usual type of breeding place. For the spleen rate the ready use and correction of Christopher's standard charts (this *Bulletin* Vol. 21, p. 597) are explained and their value in producing precise data made clear. In determining the parasite index too Christopher's final blood-corpuscle method of measuring the number of plasmodia in a given volume of blood is clearly described (this *Bulletin* Vol. 22, p. 405) and can readily be carried through in the field. It is nowadays considered essential, if possible to carry out actual measured observations so that the number of parasites per cmm. can be accurately determined. No one who has ever worked on this basis will ever return to unmeasured work. There are considered the protection of blood films in the field from dust and flies, the advantages of Giemsa stain for tropical work, the differentiation and enumeration of parasites since the parasite rate has a meaning only in relation to a known volume of blood examined. There are sections on the collection and use of statistical data, on the study of physical features and of meteorological and human conditions, eleven plates, and an appendix. Instances are given of four localities studied in India, in each of which the causation of malaria was entirely different, and it is noted how surprisingly often in a careful open-minded survey some salient feature flashed out characteristic and dominant. The importance in India of difficulties other than physical is such that the experienced malaria officer will recognize that what should be done will not be done and will not add to these difficulties by failure to appreciate all the circumstances of the case. The book seems to illustrate two general principles, the very valuable work which is done in India, and the narrow outlook which insists on limiting much of its publication to India, so that even the influence of this *Bulletin* cannot give it the world value which it deserves.

Clayton Lane

FEDERATED MALAY STATES. The Malaria Research Division (Malaria Bureau). DOWDEN (R.) P.M.O.—*Federated Malay States Ann. Rep. Med. Dept. Year 1927* Appendix B pp. 58-62.

The accompanying table illustrates the very different picture of anopheles distribution obtained in the same place from larval catches

in rice fields and from capture of adults in adjacent houses. The former represent the collections per hundred dips with a dipper measuring 1300 to 1500 cc. Of 1467 females dissected only two were found infected both being *A. aconitus*.

C. L.

TABLE

Density of Anopheles larvae shown as No per 100 Dips.
Total No of Dips 44 567 Total No of Larvae caught 36 170

Species.	Sept.	Oct	Nov	Dec	Jan.	Feb	Mar	Apr	May
<i>fuliginosus</i>									
Larvae	62	70	51	43	37	15	9	10	—
Adults	—	4	11	11	1	1	—	2	—
<i>hyrcanus</i>									
Larvae	20	26	31	29	24	8	11	10	12
Adults	7	15	36	18	5	—	1	3	2
<i>barbirostris</i>									
Larvae	11	19	29	22	21	14	11	10	12
Adults	5	6	2	—	1	1	1	4	—
<i>aconitus</i>									
Larvae	—	—	0 5	7	12	21	3	5	5
Adults	13	46	88	180	131	85	111	32	46
<i>kochi</i>									
Larvae	—	—	—	—	0 2	0 7	2	—	—
Adults	6	7	—	1	—	—	1	13	3
<i>vagus</i>									
Larvae	—	—	—	—	—	0 1	1	—	0 1
Adults	289	143	49	25	2	7	3	10	3
<i>maculatus</i>									
Larvae	—	—	—	—	—	0 3	—	—	—
Adults	—	—	—	—	—	—	—	—	—
<i>karwadi</i>									
Adults	—	1	—	—	1	—	—	—	—
Total									
Larvae	93	115	112	101	94	59	37	35	48
Adults	320	222	186	235	141	94	117	64	59
Rice Crop	Planted out	Growing				Harvest	Fallow		

ROBBINS (J. H.) An Outbreak of Malaria among the Civilian Population of Olongapo, P.I.—*U.S. Nav. Med. Bull.* 1928 Apr Vol. 26 No. 2. pp 451-461

Robbins describes his experience in this station in the Philippine Islands and certain experiments with Paris green given partly floating and partly sunken to kill both surface and deep feeders. It seems to have been effective. A long editorial note deals with floating and sunken Paris green and with oil and by inference corrects certain mistakes in nomenclature but adds some printers' errors. The use of *Edes* for *Aedes* and of *A.* to indicate *Aedes* as well as *Anopheles* is confusing.

C. L.

YOUNG (T. C. McCombie) & BAILY (J. D.) *Malaria in Coorg.—Indian J. Med. Res.* 1928. Jan. Vol. 15 No. 3 pp. 745-788. With 12 charts, 2 folding maps & 2 figs. on 1 plate. [25 refs.]

Coorg in Southern India on the Western Ghats, the smallest province in British India, with a population of about 175 000 must be classed as a hyperendemic area, has been so since 1870 at least, and suffers from blackwater fever. Its economic history is closely bound up with coffee but reasons are given for the conclusion that the vicissitudes of the estates have had no influence on malarial prevalence. The consumption of quinine, too is no measure of malaria, but merely of the extent to which the drug has from time to time been made available. Local conditions are described and conclusions drawn so far as this was possible from a single short visit. A point of interest is that in opposition to advice by Hasell Wright in 1919 drainage was effected by open stone-pitched drains and larvae of *A. listoni* were found in these in large numbers sheltering like trout behind stones and in miniature bays. Yet in houses at whose doors this breeding was occurring and whose inhabitants had a high spleen rate adult anophelids were almost never found. Evidently the prolific vegetation provided them with a more congenial shelter. In two adjacent coffee estates spleen rates varied as 100 and 38—the coffee lines in the latter were on the top of a hill in the former nearer a stream. There are no latrines on coffee estates and ankylostomiasis is judged to be rife. Time-occupying methods are given for determining the average position of the spleen's apex in different groups. Legends to chart and map are not to be accepted as they stand.

C. L.

SERGEANT (Edm. & Et.) PARROT (L.) FOLEY (H.) & CATANER (A.) *La mesure du paludisme endémique. Measurement of Endemic Malaria.*—*Arch. Inst. Pasteur d'Algérie* 1928. Mar. Vol. 6. No. 1 pp. 1-13. With 1 text fig. [6 refs.] [Pasteur Inst. Algiers.]

Some eighteen years ago Ronald Ross laid down the principles which must underlie an effort to determine the malariousness of a particular locality. Neither the spleen index nor the parasite index suffices, but all cases in which parasites alone are detected, all cases in which enlarged spleen only is present and all in which both are present must be added together to give Ross's endemic index. When a choice must be made of a site for dwelling houses, it should be based on the endemic index.

Again Ross's mean splenic enlargement should be determined. The writers advise as the most convenient means of doing so that hypertrophy beyond the costal margin should be measured in finger breadths, 1 to 6 and that the number of spleens falling in each category should be multiplied by the corresponding number of finger breadths, the totals added and these divided by the total cases. Multiplying the spleen index by the mean splenic hypertrophy there is reached the splenometric index, which gives a good pointer as to the effect of antimalarial work. Thus in Mitidja there was in April, 1924 a splenic index of 50.9 and in November after a quinine campaign one of 48.1 but the splenometric indices were respectively 213 and 110.

C. L.

SERGEANT (Edm & Et) FOLEY (H) PARROT (L.) & CATANEI (A)
 Les principes de l'assainissement antipaludique. [*Principles of
 Antimalarial Sanitation.*]—*Arch Inst Pasteur d'Algérie* 1928.
 Mar Vol. 6 No 1 pp 14-17 [Pasteur Inst Algiers.]

The principles cited, not all of world wide application form the following logical sequence. Defensive methods (quinine and screening) which protect the individual from infection are less effective than offensive measures against mosquitoes for the numbers of these must as a first measure be reduced below a certain level by attack on their breeding places. Useless water stagnant and full of vegetation breeds anopheles and must be suppressed. Useful water includes running water deep water without vegetation and soiled water—all of which do not breed anopheles and disciplined water which does if it stands for 15 days. To prevent this last stagnation is then the object of antilarval measures. When by these means adequate reduction of anopheles has been effected plasmodia must be attacked directly by quinine or some other equally effective drug or indirectly by raising the standard of living and the level of resistance to infection.

C. L.

FOLEY (H) CATANEI (A.) & GIRAUD (A.) L'evolution du paludisme chez les enfants indigènes dans une région progressivement assainie par les mesures antipaludiques. [*Development of Malaria in Native Children in a Region rendered Progressively Healthy by Antimalarial Measures.*]—*Bull Soc Path Exot* 1928. Dec. 12. Vol. 21 No 10 pp 856-867 With 4 folding charts. [4 refs.] [Pasteur Inst Algiers.]

In Beni Ounif-de Figing malaria was almost extinguished by 1914. By 1924 owing to relaxation of antimalarial measures due to the War the splenic index was as high as 27.5 and the parasite index 61.5. Anopheles breeding was then entirely stopped, it is held, and quininization of part of the population was practised. The present investigation involved taking the axillary temperature morning and evening and a blood smear every morning for over a year of four infected children three thick drops being examined daily by two observers. In one case the last parasitic find was six months after beginning observation in a second five months in the third plasmodia were found off and on throughout the period, and in the fourth the only positive examination occurred after the test had run for 13 months. In no case was any antimalarial treatment of any kind taken throughout.

C. L.

NEVES (J Silva) & ORNELAS (A.) Índice endêmico palustre da cidade de S. Paulo de Luanda. [*Malaria Index of Loanda.*]—*Bol da Assisi Méd aos Indigenas* Loanda. 1928. Sept. & Oct. Vol. 2. Nos. 9 & 10 pp. 95-115 155-177 With 2 charts 1 folding map & 1 text fig. French summary pp. 177-181.

The capital of Portuguese West Africa has a population of nearly 23 000 and a spleen rate in 151 children of 38.4. 247 kgm of quinine were distributed free in 19 months. Malaria has two peaks April-May the higher and November-December. The parasite index was about

MAZZA (Salvador) & RICKARD (E. R.) Investigaciones sobre las relaciones entre paludismo y cultivo del arroz en la provincia de Tucumán Segundo informe preliminar [Relation between Malaria and Rice Cultivation in Tucuman].—*Prensa Méd Argentina*. 1928. Oct. 30. Vol. 15 No. 15 pp. 651-654.

Observations between March 27th and April 20th, 1928, failed, except in one instance, to recover larvae of *Pseudopunctipennis* in rice-fields. It is accordingly believed that rice culture should not be interfered with. It provides a summer crop where only the winter sugar cane is otherwise available and so helps to cut the vicious circle malaria-poverty-malaria which would otherwise function continuously.

C. L.

BENARROCH (Elías) Estudios relativos al paludismo I Investigación de los anófeles malaríferos de Venezuela. 2. Persistencia y fluctuaciones de los gametocitos en la sangre periférica. Tesis presentada a la Universidad Central de Venezuela, para optar al título de Dr. en Ciencias Médicas. [Studies in Malaria].—38 pp. With 4 text figs. [17 refs.] 1928 Caracas.

This thesis consist of two parts. In the first is given an account of the various species of Anopheles found in Venezuela, sixteen in all. Investigations were undertaken to decide which could be experimentally infected from patients with gametocytes in their peripheral blood, while many specimens of each were dissected in order to discover which were naturally infected. Only one *A. albimanus* was infected experimentally but the attempts were too few for any conclusions to be drawn. Ten were found naturally infected, but two of them, namely *A. apertumaculata* and *A. punctumaculata*, only once. The remaining eight were *A. pseudopunctipennis*, *A. albimanus*, *A. larumaculatus*, *A. stroderi*, *A. beckmanni*, *A. argyritarsis*, *A. albatus*, and *A. darlingi*.

The second part is a study of the fluctuations in the numbers of gametocytes found from day to day in the peripheral blood of 15 malarial subjects. These are presented in tabular form. It is noteworthy that in one patient, anaemic and debilitated by infection with *Vector americanus* they persisted for 60 days or more in numbers as high as 60 crescents per 500 leucocytes.

H. Harold Scott.

PORTO RICO REVIEW OF PUBLIC HEALTH & TROPICAL MEDICINE. 1927 Dec Vol. 9 No. 6 pp. 240-248 1928. Jan Vol. 9 No. 7 pp. 279-286 & Feb No. 8 pp. 321-330.—Report of Bureau of Malaria Control 1926-27 Parts I, II & III.

Some local experiences of general interest are reported. Automatic tide gates are essential where as here much of the low land is only slightly above low tide level. Yet the large size of those here set up necessary because of the large amount of water with which they deal and their consequent weight, make them insensitive when the head of water is less than a foot. At the last of the ebb they have to be propped open. In mosquito control the aim is to maintain a low anopheles density in the controlled area. Less emphasis is now being laid on prolonged quinine administrations. The value of the local campaign is reflected in a parasite rate of 0 within the controlled area and one of

23 outside it (both in children with palpable spleens) The extraordinary patchy character of malaria infection is emphasized, highly infected and almost non infected areas lying very close together

C. L.

KEYWORTH (W. D.) **Severe Malaria among British Troops in the East African Campaign.**—*Proc Roy Soc. Med* 1928 Dec. Vol. 22 No 2. pp 103-112. (War Sect pp 1-10) [12 refs] also in *Jl Roy Army Med. Corps* 1929 Mar Vol 52. No 3 pp 175-188 [12 refs]

Although East Africa was a subsidiary theatre of war 300 000 allied troops were employed there and the sickness rate mostly from malaria, was higher than in any other The total admissions for malaria were estimated at about 250 000 Quinine prophylaxis was useless Nets [probably narrow ones] were equally valueless. Laboratory facilities were ludicrously inadequate far less effective than the equipment the Germans showed the writer after the armistice. A hurricane lantern the simplest stains and a night shift after his own 100 beds had been seen to formed the writer's contribution to the diagnostic problem Reticular appearance of the red cells forming the background of a thick-drop preparation is looked on as evidence of malaria, and the thick-drop proved invaluable The amount of malaria pigment was sometimes very great He arrived in East Africa completely prejudiced against intramuscular injection of quinine. He left it convinced that in field conditions in patients unable to take it by mouth it was the best route Chemical sterilization (ten minutes in pure carbolic acid) was preferred where life of syringes and needles must be as long as possible His experience suggested that to combine lumbar puncture with quinine administration in comatose cases was the method of election [See too CORDES in this *Bulletin* Vol. 23 p 544]

C. L.

MANALANG (C.) **Notes on Malaria Transmission.**—*Philippine Jl Sci* 1928 Sept Vol. 37 No 1 pp 123-131 With 10 figs on 4 plates. [4 refs.]

Malaria transmission in the Philippines is by *A. minimus* for only that species has hitherto been found infected with an oocyst rate of 0.83 and a sporozoite rate of 0.35 in 2,283 females examined Most catches were made by exposing the body in the open and using a flash light the mosquito being held to be wild since it is seldom found in the ordinary nipa house even at night The only catches in the day time have been of specimens imprisoned by wire screens

During the period of heavy catches they have shown preferential harborage in two houses out of about seventy five and incidentally where most of the new malaria cases were registered [Perhaps significantly would be a better adverb The writer's wording is not always easy to understand.]

C. L.

- WILLIAMSON (K. B.) The Nitrogenous and Total Organic Content of the Soil in Relation to Malaria.—*Malayan Med J* 1928. Dec. Vol. 3 No 4 pp. 148-164 [18 refs.] [College of Med., Singapore.]

The higher incidence of malaria in hill valleys is generally correlated with a smaller nitrogen content in the soil, but not so far as could be traced, with geological formation. When the nitrogen content of the soil rises to about 0.3 per cent approximate anopheline-sterility should result

C. L.

- RAO (G. R.) Economic Significance of Malaria to an Industrial Concern: a Railway.—*Indian Med Gaz.* 1928 Oct. Vol. 63. No 10 pp 568-573 With 3 graphs in text [3 refs.]

The writer considers the economic effect of malaria in the Lalmanirhat District of the Eastern Bengal Railway the District comprising 11 sections with varying degrees of malarial incidence. Grading the staff into pay groups and taking the number of days lost to the railway by malaria in each group (the method of diagnosis being presumably clinical) it is calculated that in this District alone the yearly loss to the railway from this infection is over Rs 30 000. Moreover there is the loss by inefficiency due to mental worry when families of employees are seriously ill of malaria regarding which Rao gives a striking instance where the disobedience of a signaller to an order given by a stationmaster distracted by his wife's illness, saved from wreckage a goods and a mail train

C. L.

- CRAIG (Charles F.) Malaria.—*Arch of Path* 1928 Oct. Vol. 6. No 4 pp 645-723. [238 refs.] Army Med. School, Washington, D C.]

This detailed and valuable critical review of the present position of malaria cannot be abstracted

C. L.

- HANCE (J. B.) On Malaria as an Independent Etiological Factor in Portal Cirrhosis.—*Guv's Hosp Reports*. 1928 Oct Vol 28 (Vol. 8 4th Ser) No 4 pp 379-407 With 1 fig [18 refs.]

On the divided opinion as to whether malaria alone ever leads to a true cirrhosis of the liver Hance gives details of twenty cases of the condition in which alcohol can be excluded in view of the short life span of a Mohammedan villager on the north-west frontier of India who might be even suspected by his fellows of such indulgence in any form. All twenty had had fever and 19 showed (the twentieth was not so examined) on spleen puncture broken down malaria parasites or their pigment. In all, the spleen was enlarged while the liver might or might not be so. Microscopically in two patients who died the liver showed advanced chronic interstitial hepatitis with some pigment and columns of epithelium-like cells, possibly new bile ducts. Subtertian rings were present in a third of the cases in which they were looked for.

The whole picture is thus one of a series of cases of cirrhosis, identical

in the fatal cases in pathological and histological appearances from which all usually accepted factors can be excluded and in which every case showed positive evidence in history and spleen puncture of prolonged and intense malarial infection

C. L.

PINHO (G de Souza) & PINHO (S Ferreira) Melos de avaliar a redução de malaria apos a realização de uma campanha prophylactica [Estimation of Reduction of Malaria after an Antimalarial Campaign.]—*Folha Med* 1928 Oct. 5 Vol 9 No 28 pp 332-333

The writers found that antilarval measures drainage and supplementary oiling had no effect on spleen or parasite indices but brought down markedly the numbers of fever cases. They conclude that these last form the most exact measure of malaria and that supposed relapses are really fresh infections.

C. L.

FERRI (Claudio) Sull ombreggiamento antimalarico dei focolai anofeligeni. Terza nota preliminare. [Shading as an Antimalarial Measure for Anopheline Areas.]—*Malariologia* 1929 Jan. 31 pp 65-68 [3 refs.] [Hyg Inst Univ Sassari]

Ferri considers various trees by which shade can be obtained over rivers thus rendering them unsuitable for the breeding of local anopheles their distance of planting the filling up of intervals between their trunks by bushy shrubs, the use of horizontal water plants for the same purpose the cost of obtaining shade by such means as canes aspens poplars and elms and the income they are likely to bring in

C. L.

SAYERS (Edward G) Quartan Malaria in the British Solomon Islands with a Preliminary Note on the Incidence of Different Types of Malaria.—*Trans Roy Soc Trop Med & Hyg* 1928 Nov 25 Vol. 22 No 3 pp 291-292. [Methodist Mission Hosp Roviana, New Georgia.]

In 48 cases in which the type of plasmodium could be determined the percentage distribution was tertian 63, subtertian 20 quartan 13 quartan and tertian 2 quartan and sub-tertian 2. Parasites were readily found in children rarely in adults.

C. L.

PROUTE [Bilan de l'effort antipaludique dans le secteur hydraulique de Barnaul depuis 1921 à 1927] [Results of Antimalarial Measures at Barnaul from 1921 to 1927]—*Russian Jl Trop Med* 1928 Vol 6 No 8 pp 489-500 [In Russian French summary p 500]

The percentages of the working men at Barnaul [? Western Siberia] who were malarious were 36 in 1921 and 67 in 1923. Registration of sick and quinalization were then introduced. From 1925 to 1927 the infection amounted to about 10 per cent. In roughly a thousand examinations infections with *P. vivax* fell in those years from 67 to 13 while those with *P. falciparum* were 11 40 and 19. Similarly the parasite index fell from 8.3 to 3.2 and Roes's index from 1.62 to 1.14

C. L.

GASTAMINZA (Ubaldo) Observaciones acerca del paludismo visto en el hospital de la Cruz Roja de villa Sanjurjo (1928) [Malaria seen in a Red Cross Hospital, Morocco.]—*Medicina Práctica* Madrid. 1929 Jan. Vol. 2. No 1 pp 56-64

281 cases from the Rif were examined and 48 showed plasmodia, 33 being infected with *P. vivax* and 13 with *P. falciparum*. Six came under observation in February to April, 19 in May to August, and 23 in September to October. *P. vivax* predominated in the early months and *P. falciparum* later.

C. L.

GENOVESE (Giovanni) & ZALLOCCO (Antonio) Gli edemi nella malaria dei bambini [Oedema in Malaria in Children.]—*Pediatrics*. 1928 Dec 15 Vol. 36. No. 24 pp. 1309-1336 [Inst. Clin. Pediat Univ Rome]

18 cases of oedema are reported in over 300 malaria-infected children. The condition is not uncommon in acute and is almost invariable in chronic cases. It may be fugitive limited to the haemoclastic crisis, and is apt to accompany gastro-intestinal symptoms. Less important is oedema caused by malarial cardiac or renal lesions, by cachexia or by hydraemia. Rarely oedema takes the place of a malarial paroxysm.

C. L.

DURNEY (A. B.) Tropical Asthma. [I Port-of Spain Med Soc 1927 pp 116-120]

The writer is convinced from his experiences, some of which he mentions, that tropical asthma is in the main malarial, caused by the deposit in the lungs of malarial pigment, just as is that of the coal heaver by deposit of coal dust, and is curable in the early stages by quinine.

C. L.

KIRWAN (E. W. O'G.) Malaria as a Cause of Cataract.—*Indian Med. Gaz.* 1928 Dec. Vol. 63. No 12. pp. 697-698.

From a large clinical experience in dark room work in India the writer finds no fundus condition characteristic of malaria. He describes three cases in which he attributed cataract to that infection.

C. L.

DREWSKY (A. Ehr.) Die Ergebnisse therapeutischer Versuche mit Plasmochin in bulgarischen Malariedörfern. [Treatment Trials with Plasmochin in Bulgarian Villages.]—*Arch f. Schiffs u. Trop Hyg.* 1928. Nov. Vol. 32. No 11 pp. 575-580 With 1 text fig. [1 ref.]

Report is made on 209 patients, in about 20 per cent. of whom parasites were not found. Treatment was on lines advised by the makers of the drug. Its value is stressed in quinine resistant cases, which the writer evidently holds to be not uncommon, in blackwater fever in pregnancy in malarial diarrhoea of children and in quinine idiosyncrasy. It is held to have specific action on gametocytes, especially crescents, which were never seen in the blood after 3 days treatment. There was very rapid shrinkage of the spleen. In many cases there appear in 4 or 5 days cyanosis, vomiting, diarrhoea and

coinc, all disappearing within 2 or 3 days of stopping the drug. A plasmoquin resistant strain of subtertian parasites is invoked as explaining the relapses following plasmoquin and quinine treatment.

C. L.

HASSELMANN (C. M.) & HASSELMANN KAHLEIT (Margarete) **Notes on Plasmoquine (Plasmochin)**—*Philippine Jl Sci* 1928 Sept Vol. 37 No 1 pp 75-121 With 1 text fig [60 refs.]

This paper must be warily read. In testing plasmoquin compound the tablets used were those of half normal size. The results obtained from 6 tablets daily were poor and, naturally, ill effects were not conspicuous nevertheless the dosage of plasmoquin has been as high as 0.32 gm. daily instead of 0.06. It is stated erroneously that MÜHLENS has advised the use of these small tablets (this *Bulletin* Vol. 25 p 565) and has rescinded this decision. Indeed the confusion which MANSON BAHR warns against (p 375) is all too excellently illustrated. Table headings speak of treatment by plasmoquin irrespective of the use sometimes of plasmoquin only and sometimes of plasmoquin compound. Plasmoquin (pure) was given normally to tertian cases in daily doses of 0.06 gm. continued till the day of discharge from hospital, so that its real curative effect seems not to have been tested. Apparently patients were expected to continue taking the drug after leaving hospital since it is said of one, after discharge from the hospital, the patient carelessly took too small an amount of plasmoquin compound and came back after four weeks not only with fever loss of fifteen pounds and headache but also with a few crescents in the thick blood film. Crescents had never been found before. It is concluded that relapses are few compared with those following quinine that the side effects (cyanosis gastralgia) while never having required the discontinuance of the drug yet make medical supervision absolutely indispensable and that the drug is superior to quinine in tertian infection and specifically gametocidal in subtertian.

C. L.

HILL (Rolla B.) & BENARROCH (Elias) **Tratamiento de los portadores de Gametocitos con plasmoquina. [Treatment of Gametocyte Carriers with Plasmochin.]**—*Gac Med de Caracas* 1928. July 31 Vol. 35 No 14 pp 209-211 [1 ref.] [Lab of the Rockefeller Foundation & National Health Maracay.]

The drug was given, either in simple or compound tablets in daily dose of 0.06 gm. nominally in five 7-day series with 3 clear days interval between each but actually only for two courses in 5 of the 15 cases tabulated. 7 do not seem to have been examined after the 17th day. In one case crescents appeared on the 29th day of treatment with simple plasmoquin to the extent of 100 for every 500 leucocytes and were still present on the 21st day of the compound treatment which followed.

C. L.

DE BUEN (Sadi) Importancia de la plasmochina y del quineto en la lucha antipalúdica. [Plasmochin and Quineto in Malarial Treatment.]—Reprinted from *Boletín Técnico Dirección General de Sanidad* 1928. Dec. Year 3 No. 12. pp. 729-737 [3 refs.]

Having passed in review the reasons for desiring a drug other than quinine for treating malaria, de Buen tabulates the results obtained by him with quinine, quineto or the total alkaloids, and plasmochin and quinine. Regarding the last the administration to an adult consisted of plasmochin only 0.06 gm. daily for ten days, quinine only in dose unstated in this paper for ten days, and again plasmochin only for ten days. The results regarding relapses were as follows—

	Quinine		Quineto.		Plasmochin and quinine	
	Children.	Adults.	Children	Adults.	Children.	Adults.
Treated June to Dec. 1927	33	8	15	13	26	15
Relapsed Jan to April, 1928	18	0	8	2	0	0
Relapsed per centage	51.4	0	53.3	15.4	0	0

Plasmochin had to be stopped on account of unwelcome symptoms in 14 per cent of these cases for cyanosis in 8 per cent. for nervous symptoms, intestinal pain and trifling general disturbance each in 2 per cent

C. L.

WALLACE (R. B.) Plasmochin Compound in the Field.—*Malayan Med. J* 1928. Dec. Vol. 3 No. 4 pp. 145-147 With 4 figs. on 1 plate & 1 chart in text

Malarious Tamils 500 in number were treated in hospital with plasmochin compound for 14 days followed by three weekly treatments of three days each. The amount given was 0.06 gm. plasmochin and 0.75 gm. quinine daily for the first 400 cases and two-thirds of those quantities for the last hundred. In reporting its effect on circulatory plasmodia, their species are not given but the parasitifugal effects seem much as usual. No serious by-effects were noted though there were many cases of abdominal pain sickness vomiting, and headache which, however, passed off on discontinuing the drug for a day or so. Haemoglobin increased splenic enlargement lessened, pregnancy was not disturbed. As a prophylactic the drugs were given to 570 persons, the whole of one Division of the garden concerned, 0.02 gm. plasmochin and 0.25 gm. quinine for adults, at 5 a.m. and again at 4 p.m. for ten days (5th to 14th May). Oiling of larval breeding-places and hunting of the dwellings for adult mosquitoes also took place. The parasite rate fell between the first and the last day of treatment from 8.8 to 5.3 for men, from 10 to 0 for schoolgirls, was 7.1 and 7.1 for schoolboys and rose from 4.2 to 9 for working chokras. The "malaria rate" was on the first day 6.1 tenth day 3.8 sixteenth 1.8, twenty-seventh 4.8 and thirty-fourth 6.1

C. L.

MANSION BAHR (Philip) **The Therapeutic Action of Plasmochine and Plasmochine-Compound in Malaria.**—*Lancet* 1928 Sept 8 pp 496-498 With 1 chart in text

The history of plasmochin and what is disclosed of its chemical composition are sketched. They have already been dealt with in this *Bulletin*. Manson Bahr about the end of 1927 discontinued giving plasmochin and substituted plasmochin-compound. He points out the confusion which has arisen by the varying composition of the latter tablet but a further note seems needed. Their official composition has throughout been 0.01 gm. plasmochin and 0.125 gm. quinine but the makers issued in addition another series of half that strength. This MÜHLENS suppressed in a paper in the *Deut Med Woch* of 23rd December 1927. Accordingly Manson Bahr writes some nine months later. It is necessary to be explicit about the dosage of plasmochine-compound as confusion is apt to arise on this point. He advocates the following dosage and adds that it is necessary to follow this scheme closely in order to prevent relapses. For tertian and quartan malaria two tablets are given three times a day (six in all or 0.06 gm. plasmochin and 0.75 gm. quinine daily) for 7 days. Five such courses are necessary with intervals of 4 days between each the treatment therefore covering 51 days. It is said that the number of tablets to be given daily in the second to the fifth courses is twelve which would apply to the suppressed tablet. In a later issue of the *Lancet* it is pointed out in correction that the figure should be six.

Eighteen cases of tertian and eleven of subtertian malaria are reported. In each case parasites disappeared from the peripheral blood after an average dosage of 0.135 gm. of plasmochin and 1.687 gm. of quinine. On the tertian cases Manson Bahr comments. In one case only was a slight cyanosis observed after the sixth day of administration of the drug. The only other untoward symptoms noted were dyspepsia occasionally abdominal pains, and in one case only dizziness. Subsequent experience has shown that these could be removed by glucose 3i. given daily either in powder or liquid form. As with pure plasmochine a rapid contraction in the size of the spleen took place and a corresponding clinical improvement in the condition of the patient was noticed. Two of the cases showed clinical relapses within six months. Of the eleven subtertian cases he writes. In two cases owing to the severity of the symptoms—vomiting and pyrexia—the action of plasmochine-compound had to be reinforced by two intramuscular injections of quinine grs. 5 each. Nevertheless in three very severe cases the clinical improvement was striking and quite as satisfactory as after intensive quinine treatment. One quartan malaria intractable under quinine for four years became slightly cyanosed after a full course of plasmochin compound. The clinical results as far as could be ascertained were satisfactory and no more relapses have occurred. The physical condition is satisfactory.

C. L.

ACHUNDOW (I) **Ueber Plasmochin Nachweis im Urin [Detection of Plasmochin in Urine.]**—*Arch f Schiff u Trop Hyg* 1928 July Vol. 32. No 7 pp 347-351 [8 refs.] [Inst for Ship & Trop Diseases Hamburg]

The author confirms the statement of SCHULEMANN SCHÖNHÖFER and WINGLER (this *Bulletin* Vol 25 p 568) that their chloranil test

DE BUEN (Sadí) Importancia de la plasmochina y del quineto en la lucha antipalúdica. [Plasmochin and Quineto in Malaria Treatment.]—Reprinted from *Bol. Técnico Dirección General de Sanidad*. 1928. Dec. Year 3. No 12. pp. 729-737 [3 refs.]

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	Quinine		Quineto.		Plasmochin and quinine	
	Children.	Adults	Children.	Adults	Children.	Adults.
Treated June to Dec. 1927	35	8	15	13	23	15
Relapsed Jan. to April 1928	18	0	8	2	0	0
Relapsed per centage	51.4	0	53.3	15.4	0	0

Plasmochin had to be stopped on account of unwelcome symptoms in 14 per cent of these cases for cyanosis in 8 per cent for nervous symptoms intestinal pain and trifling general disturbance each in 2 per cent

C. L.

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C. L.

are therefore all inferior to quinine itself their relative therapeutic efficiencies depend on the facility with which they undergo hydrolysis to quinine in the body and this naturally varies with the nature of the particular acid residue inserted in the quinine molecule.

T A Henry

SINTON (J. A.) BIRD (W.) & EATE (S. N.) *Studies in Malaria, with Special Reference to Treatment. Part VIII. The Oral Administration of Quinine-Stovarsol in the Treatment of Chronic Benign Tertian Malaria.*—*Indian J Med Res* 1928 Jan. Vol. 15 No. 3 pp 595-600 [7 refs.] [Quinine and Malaria Enquiry Indian Research Fund Assoc.]

Two quinine-stovarsol preparations were tested by being given for 20 days and the occurrence of relapse within 8 weeks was noted. After one preparation relapses followed in 10 of 12 or 13 cases, after the other in 6 of 10. In 4 control groups relapses under Sinton's quinine and citric acid mixture were 48 per cent and in 3 other 62, 74 and 60.5 per cent. A provocative effect as shown by a severe febrile reaction was displayed by one of the preparations, so that the dose had to be lessened. The percentages of those showing splenic enlargement before after 1 week's and after 4 weeks treatment were for the stovarsol groups (23) 39.1 17.3 and 17.3 and for the quinine groups (108) 30.6 10.2 and 7.4

C. L.

LEGENDEE (F. M. A.) & MONDAIN (A.) *L'action du quinio-stovarsol sur les schizontes de Plasmodium falciparum* [Action of Quinine Stovarsol on Schizonts of *P. falciparum*].—*Bull Soc Path Exot* 1928 Oct 10 Vol. 21 No. 8 pp 625-629

Quinine stovarsol was given by mouth in a ten-day course to 24 persons in whom a thick drop showed schizonts of *P. falciparum* and no other plasmodia of any kind. The dosage for an infant under one year was 0.25 gm. one to two years 0.375 gm. two to five years 0.5 gm. five to ten years 0.75 gm. ten years and over 1 gm. Tablets of 0.25 gm. were crushed and suspended in water. Disappearance of plasmodia was experienced. In only two cases was the observation period extended to as much as about a month.

C. L.

LABERT (L.) *Action thérapeutique du quinio-stovarsol sur le Plasmodium falciparum* [Therapeutic Action of Quinine-Stovarsol on *P. falciparum*].—*Bull Soc Path Exot* 1928 Nov 14 Vol. 21 No. 9 pp 760-761

An infection with *Plasmodium falciparum* did not yield to injection, presumably intramuscular of quinine in a dose of 2 gm. daily. Eight days after beginning quinine-stovarsol, 1 gm. daily no parasites, schizonts or gametocytes were found in the blood and the man was 3 kgm. heavier

C. L.

SINTON (J. A.) BIRD (W.) & ORR (W. B. F.) *Studies in Malaria with Special Reference to Treatment. Part X. Quinine-Troposan in the Treatment of Chronic Benign Tertian Malaria.*—*Indian J. Med. Res.* 1928. Oct. Vol. 16. No. 2 pp. 333-339. [3 refs.]

Quinine-troposan was administered in tablets of 0.25 gm. each containing 50 per cent. quinine and 40 per cent. troposan, the total dosage being 21 and 16.8 gm. and the daily dose either 6 tablets for 28 days, or 9 for 14 days and 6 for 7 days. The relapse rate for the first series was 55 (10 of 19) and for the second 42 (14 of 33).^{*} In 22 plasmoquine cases (0.08 gm. daily for 28 days) it was 22 in 20 plasmoquine compound cases (0.1 gm. plasmoquine and 1.23 gm. quinine daily for 28 days) it was probably 0. Splenic enlargement was less reduced than with other drugs. Prophylactic measures should always be taken against chance of arsenical poisoning.

C. L.

PUYAL (J.) NAVARRO-MARTÍN (A.) ALVAREZ-CIENFUEGOS (J. M.) *El dimetarsinato de quinina en el paludismo agudo y crónico. (Dimethylarsenate of Quinine in Acute and Chronic Malaria.)—Medicina Pálida Cálida* Madrid. 1928. Nov. Vol. 1. No. 6 pp. 546-549. 1 ref.

Dimethylarsenate of quinine has the formula $[C_{10}H_{11}As_2O_2] \cdot HOAsO(CH_3)_2$. From experiments on rabbits it is concluded that the maximum intravenous dose must be less than 0.18 gm. per kilo, and should be not more than 0.075 gm. per kilo or 1.5 cc. of a 5 per cent. solution given intravenously and 1.5 cc. intramuscularly. The maximum dose administered to patients has been 0.1 gm. for a person of over 50 kilos. Three cases are reported in which two or three injections were given varying from 0.5 to 2 cc. of a 5 per cent. solution, with disappearance of all parasites from the skin blood.

C. L.

GREEN (Richard). *The Treatment of Malaria with Aseplene.*—*Bull. Inst. Med. Res. Federated Malay States*. 1928. No. 3. 4 pp. With 20 charts.

Aseplene is a proprietary preparation made in London and widely advertised in Malaya and Siam. Its accompanying literature states that there will be practically no more fever after the first 48 hours of its administration, that the malaria parasites are killed by the action of "aseplene" without injury to other cells of the body and that there has not been a single failure in successfully treating malaria, even in the most chronic state.^{*} It is a reddish-brown fluid with a pungent smell and a taste suggesting formalin.

Tests showed that during its administration haemoglobin fell, spleen enlarged, plasmodia persisted and generally increased in numbers, and that the fever was unimpaired. "The condemnation of the use of quinine in the treatment of malaria, contained in the advertisement

These are "possible maximum" rates, rather higher than the "observed minimum" rates: the difference is due to the observations of some patients being incomplete.

for aseplene is unjustified and dangerous. From the results observed in the ten cases reported it may be definitely concluded that aseplene is of no value in the immediate treatment of malaria.

C. L.

BALLIF (L.) & LUNEVSKI Inoculation expérimentale de la malaria par voie intrarachidienne. [Intraspinal Injection of Malaria].—*C R Soc Biol* 1928. Oct. 19 Vol. 99 No 28. p 1178.

After abstraction of 2 to 3 cc. of cerebrospinal fluid 0.5 to 1 cc. of blood containing *P. vivax* was injected into the sac. There was headache with temperature up to 38.5 for 2 to 5 days. Later malaria parasites established themselves in all respects normally in the peripheral blood. That is they passed readily out of the cerebrospinal fluid into the general circulation. The effects on the nervous system did not differ from those which follow subcutaneous or intravenous injection of malarial blood.

C. L.

SINTON (J. A.) ORR (W. B. F.) & AHMAD (Bashir) Some Physico-Chemical Changes in the Blood, produced by the Malarial Paroxysm.—*Indian Jl Med. Res* 1928. Oct. Vol. 16 No. 2 pp. 341-345 [16 refs.]

Twenty cases were examined but only 7 of these during a rigor. Blood was drawn from a vein. The surface tension of the blood nearly always fell during the rigor. In 4 persons tested for refractive index, this rose in 3 and fell in 1. Bilirubin rose during the paroxysm. The conditions which were found resemble those of anaphylactic shock and add to the evidence that the rigor is an expression of this condition.

C. L.

RATCLIFFE (Herbert L.) The Relation of *Plasmodium falciparum* to the Human Red Blood Cell as determined by Sections.—*Amer Jl Trop Med* 1928. Nov. Vol. 8. No. 6. pp. 559-562. With 11 figs. [5 refs.] [School of Hyg & Public Health Johns Hopkins Univ. Baltimore Md.]

In this *Bulletin* vol. 25 p. 574 was published an illustrated abstract showing that *P. vivax* and *P. praecox* (properly so termed the bird parasite) are intracellular. Ratcliffe has now given similar pictorial evidence that the same holds for *P. falciparum* which he summarizes as follows. Placental tissues from a person infected with *Plasmodium falciparum* was fixed in Bouin's fluid, dehydrated, and embedded in paraffin. Sections 2 μ in thickness were cut and stained in Harris's hematoxylin. The parasites have been found invariably to be intracellular.

C. L.

ROW (R.) Observations sur le paludisme et la formation des gamètes de plasmodium en cultures. [Observations on Malaria and the Formation of Gametes in Cultures].—*Bull Soc Path Exot* 1928. Oct. 10 Vol. 21 No. 8. pp. 607-610. With 4 figs. on 2 plates. [1 ref.]

This paper consists of a series of statements regarding the development of plasmodia based on their study in cultures. The number of

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C. L.

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was intensified by preliminary elimination of haemolytic amboceptor and there was no parallelism between the intensity of reaction and the clinical importance of infection.

C. L.

- i. HENRY (A F \) 1 contribution à l'étude sérologique de l'infection palustre 2^e sérothérapie anti pneumococcique avec saignée préalable dans la pneumococcie chez les paludéens [Serological Study of Malaria.] Rapport présenté au Congrès de Constantine de l'Association Française pour l'Avancement des Sciences 9 pp
- ii — Etude sérologique de l'infection palustre — *Paris Méd* 1928 June 23 7 pp
- iii LE BOURDELLES (B) & LIÉGEOIS (R.) Contribution à l'étude de la réaction de Henry (ferro- et mélanoflocculation) sa valeur dans le diagnostic de l'infection palustre — *C R Soc Biol* 1928 May 18 Vol 98 No 15 pp 1342-1344 [2 refs]
- iv HENRY (A F \) A propos de la sérologie de l'infection palustre — *Ibid* Sept 18 Vol 99 No 28 pp 819-821 [1 ref]

i and ii Henry describes certain serological tests for malaria.

Ferroflocculation 2 per cent Boutry solution preserved on ice is diluted 1 in 6 and 1 in 12 in distilled water thus giving dilutions of metharfer of 1 in 300 and 1 in 600 To each dilution [the quantities seem unstated] add 0.2 cc of clear untreated serum shake incubate at 37° C for 1½ hours Remove to room temperature for half an hour Read two hours later neglecting doubtful flocculations All 58 malaria cases actually infected gave the reaction. Sera of 85 suffering from other diseases did not.

Melanin from the choroid and vitreous of bullocks eyes with distilled water and formalin added is suspended and diluted and to this serum is added Malaria serum produces flocculation and deviation of complement

iii Le Bourdelles & Liégeois failed to confirm these findings

iv Henry believes that the mode of preparation of choroidal pigment used by these writers is not his own There seems also to be difficulty in distinguishing a true flocculation from a false one

C. L.

- Row (R.) A Simplified Technique for culturing Malarial Parasites Aerobically — *Indian Med Gaz* 1928. Nov Vol. 63 No 11 pp 628-630 With 3 text figs [4 refs.]

Growth has occurred readily at laboratory temperature in Bombay 87° F to 90° F using the writer's technique (this *Bulletin* Vol. 10 p 169) The essential requisites are a flat bottomed microculture tube and glucose in the serum. According to the paper 3 or 4 drops of blood are defibrinated by shaking in a test tube and a drop or two introduced into each of a series of culture tubes charged with half an inch of glucosed serum so that the corpuscles lie in open formation the better to develop The deposit is ready for examination in 12 to 24 hours or more.

C. L.

- ROBINSON (Florence E.) A Note on an Abnormal Colour Development in the Fouchet Reaction. — *Jl Med Assoc. South Africa* 1928. Dec. 22. Vol. 2. No 24 p. 667

If a patient be injected with N.A.B. and a sample of blood be with drawn into the same syringe the serum will give with the Fouchet

reagent a violet red instead of the green colour of bilirubinaemia. Blood withdrawn into a clean syringe from the other arm does not. The reaction occurs in dilutions up to 1 in 8,000 in saline and 1 in 5,000 in citrated or oxalated plasma. A combination of diagnostic and therapeutic procedure may seriously affect the value of the diagnostic test.

C. L.

OWEN (D. Uvedale) Observations on the Output of Urobilinogen in Malaria and the Influence of Quinine upon It.—*Ann. Trop. Med. & Parasit.* 1928. Dec. 28. Vol. 22. No. 4 pp. 481-502. With 20 figs. [40 refs.] [Liverpool School of Trop. Med. Liverpool.]

This very detailed work is with the exception of that of WALLACE and DIAMOND (1925 *Arch. Intern. Med.* Vol. 35 p. 699) the only one in which urobilinogen in malaria has been quantitatively estimated. The writer's summary is as follows —

"1 Urobilinogen is present in normal urines. Its output varies from hour to hour and from day to day in the same individual. It is usually present in greater concentration in afternoon than in morning or evening specimens.

"2 Cases with parasites of quartan, simple tertian or malignant tertian malaria in the blood may pass urine free from urobilinogen.

"3 No excess of urobilinogen may be found for prolonged periods in quartan and simple tertian malaria, during which the patients may have severe malarial paroxysms.

"4 It was found in greatest excess in malignant tertian malaria, particularly cerebral malaria.

"5 The output bears no relationship to pyrexia.

"6 The output bears no relationship to the degree of splenic enlargement.

"7 Urobilinogen may be present in excess in splenectomised malarial patients.

"8 Quinine increases the output in simple tertian malaria and malignant tertian malaria. Sufficient observations were not made in cases of quartan malaria, but out of four cases observed an increase was found in two.

"9 Quinine may increase the output in malignant tertian malaria in the absence of the spleen.

C. L.

HACHT ELEDA (Margot) Zur Impfmalaria der Syphilis. (Ueber den Einfluss der klimatischen Verhältnisse und Blutgruppen auf die Inkubationsdauer der Impfmalaria bei Luetikern.) [*Influence of Climate and Blood Groups on the Incubation of Inoculation Malaria.*] —*Arch. f. Dermat. u. Syph.* 1928. Aug. 21. Vol. 156. No. 2 pp. 377-382. With 4 text figs. [12 refs.] [Dermat. & Syph. Clinic Univ. Vienna.]

The subtitle describes exactly the scope of the paper. The material consists of 170 syphilitic patients studied over 3 years. The average incubation period for intravenous injection, which alone was used, was 4 to 5 days in June and July when the average mean temperatures were about 18° C. while it was 7 days in October, November and December when the temperatures were 10° C., 6° C., and 0.5° C. About the same difference was noted between compatible and incompatible blood

groups. No other factors appeared to have any influence. The best way then of obtaining infection by injection if choice be possible is to inject in the summer and to use compatible blood.

C. L.

VALLEJO NAJERA (A.) Algunas observaciones clinicas acerca del paludismo terapeutico [*Clinical Notes on Therapeutic Malaria.*—*Med. Paises Calidos* Madrid. 1928. July Vol. 1 No. 4 pp. 339-355 With 7 charts in text. [2 refs.] French summary p. 355

Although this strain of *P. vivax* carried by injection disappeared spontaneously by failing to infect it caused a 6 per cent. mortality in 130 cases one death being from hyperpyrexia. 10 per cent. had pernicious symptoms among them choleraic. The writer was well aware of the risk of contamination with *P. falciparum*. Gametocytes were never observed. The other conditions were as usual.

C. L.

KEINING (E.) & SEREFTS (S.) Biologische Studien bei Impfmalaria. [*Biological Studies in Inoculation Malaria.*—*Arch. f. Schiffs u. Trop. Hyg.* 1929 Feb Vol. 33. No 2. pp 95-104 [1 ref.] [Skin Clinic, Univ. Hamburg]

141 cases are considered comprising 47 generations of injected malaria, nearly always intravenously effected in quantities of 2.5 to 5 cc. A curious feature was the way in which groups of purely tertian manifestations alternated with other groups in which fever was tertian and quotidian. Each group contained some 10-25 cases. The alternation could not be associated with age, sex, season or stage of the mental disease and merits further investigation. None of the means employed could be made to affect the length of the incubation period.

C. L.

KRUSPE (M.) Unsere Erfahrungen mit Malaria und Saproviton. [*Experience with Inoculation Malaria.*—*Arch. f. Dermat. u. Syph.* 1929 Jan 20 Vol. 157 No 1 pp 125-141 [20 refs.] [Municipal Hosp. Dresden Friedrichstadt.]

This strain of tertian malaria, passed on intravenously for 200 passages has never shown gametocytes. In quantities of 5 or 10 cc. it has produced infection in one injection in 86.4 per cent. of cases. In 2.9 per cent. more than two injections had to be given. Incubation periods varied from 2 to 15 days—average 4. In 24 per cent. there was spontaneous recovery from malaria. In 6 of 165 cases the infection had to be cut short on account of the patient's condition. The paper contains much of venereal interest. With saprovitan treatment we are not concerned.

C. L.

MAYR (Julius K.) Zur Pathogenese der Impfmalaria. [*Pathogeny of Inoculation Malaria.*—*Muench. Med. Woch.* 1928. Dec. 28. Vol. 75. No. 52. pp. 2208-2209 [Clinic & Polyclinic for Skin & Genital Diseases Univ. Munich.]

It is noted that plasmodia develop after being on ice that they are morphologically unchanged after 24 hours in a leech but are destroyed,

schizonts that is after two hours in a mosquito. The writer took blood from a malaria case whose extent of infection is however not noted, and injected it into patient No. 1 at 9 a.m. From him, directly or indirectly the following transfers were made.

a.m.	9	10	11	12	p.m.	1	2	3	4	5
	Pt. 1	Pt. 2	Pt. 5	Pt. 3						Pt. 4.

In all cases 5 cc. of blood were injected and all persons became infected, the malaria attack in the last infected beginning 4 days before that of the first. Indeed, the fewer the parasites the earlier the attack. Again malarial blood was drawn into a syringe and ejected alcohol was then drawn in and the syringe cleaned with distilled water a solution of sodium and strontium salts was then drawn in and injected into a man three times out of five infection followed. The same occurred with neosalvarsan.

C. L.

PAOLETTI (Lomberto) *Reporti ematologici nei paratitici e terapsia malarica.* [The Blood of Paratyphics in Inoculation Malaria.]—*Polichinico* Sez. Med. 1928 Oct. 1 Vol. 35 No. 10 pp. 555-572. [11 refs.]

In 12 cases of general paratyph and three of Plaut's hallucinations the first effect of malaria, given as treatment, was in general a slight fall in polymorphs a large one in lymphocytes and a rise in monocytes during the course of the malaria a slight fall in polymorph an increase in lymphocytes and a variable condition of monocytes after malaria the monocytes usually fall to normal while the others move erratically.

C. L.

KORELOFF (Nicholas) & FIERTZ (Charles O.) *The Clinical Significance of the Life Cycle of the Parasite in Induced Malaria.*—*Ann. Jt. Med. Sci.* 1928 Nov. Vol. 178 No. 5 pp. 664-672. With 5 text figs. 2 refs.] [Psychiat. Inst. Ward's Island, N.Y.]

The writers have examined over 300 paratyphs treated with a single strain of tertian malaria, and are satisfied that it has been for many months now without gametocytes. The following curious statement is made—"In general, young ring forms, or crescents, are few in number at the beginning of a paratyph but become more numerous after the height of the febrile curve has been reached.

C. L.

HEERMANX (G.) & HERSCHIKOWSKI (H.) *Blutgruppen und Verlauf der Impfmalaria—Blood Groups and Course of Inoculation Malaria.*—*Med. Klin.* 1928, Nov. 2, Vol. 24 No. 44 (1247) pp. 1700-1701. With 1 text fig. [4 refs.] [Psychiat. Clinic, German Univ., Prague.]

Malarial infection was found to be more virulent when injected from one of the same blood group than otherwise. The amount of blood transfused was 6 to 9 cc.

C. L.

HARRIS (Noel G.) *A Case of Rupture of the Spleen after Artificial Infection of Malaria.*—*Lancet* 1928, Sept. 8, pp. 500-501. [4 refs.]

A general paratyph, infected with benign tertian malaria, had ten good rises of temperature during twelve days. "On the morning following the tenth rise he jumped out of bed suddenly. A few seconds after getting back he collapsed, and was dead in an hour. At autopsy the abdomen

was found to be full of blood from a ruptured spleen. The spleen was only semi solid, and the vessels appeared to have just torn away no defined rent being visible

C. L.

KÖXIA (Walter Jos) Hämolytischer Ikterus nach Malaria. [Haemolytic Icterus after Malaria.]—*Med Klin* 1928 Mar 9 Vol. 24 No 10 pp 378-380 [12 refs] [Med Clinic Univ., Rostock]

Two cases are described with lessened resistance of red corpuscles, enlarged and painful liver and spleen, bilirubinaemia and bilirubinuria. Plasmodia were found in neither

C. L.

RAYNAL (J) Le paludisme dans la province de Diego-Suarez quelques index spléniques. [Malaria in the Province of Diego-Suarez.]—*Bull Soc Path Exot* 1928 Oct. 10 Vol. 21 No 8 pp 629-635 With 3 plans

A survey of a province in Madagascar where malaria is hyperendemic

C. L.

KABELIK (J) Eine Bemerkung zur Arbeit des Herrn Dr G J Perekrupoff Zur Morphologie der Parasiten der chronischen Malaria (Centralbl f Bakt Abt. I Orig Bd 108 1928 S 26) [Morphology of Parasites of Chronic Malaria.]—*Cent f Bakt* I Abt Orig 1929 Jan 2. Vol. 110 No 1-3 pp 111-112.

Kabelik identifies the involution forms of PEREKRUPOFF (*ante* p 26) with those which he reported in 1917 as sexually immature resistant forms (*Wien Klin Woch* 1927 p 51)

C. L.

MACHWILADSE (N) Zur Frage der kongenitalen Malaria [Congenital Malaria.]—*Arch f Schiffs u Trop Hyg* 1928 Dec Vol. 32. No 12. pp 606-610 [5 refs] [Med Clinic, State Univ Tiflis-Georgia.]

A babe died an hour after birth. The liver and spleen were enlarged and liver smears showed merozoites grouped in twenty fours and thirty twos. The mother had all three species of plasmodium in her blood

C. L.

MAGID (M I) Ein Fall von Malaria tropica sub partu. [Zugleich ein Beitrag zur Frage der angeborenen Malaria] [Subtertian Malaria in a Parturient Woman. Congenital Malaria.]—*Monatsschrift f Geburt u Gynäkol* 1928 Aug. Vol. 79 No 6 pp 404-413 [28 refs]

The mother died comatose on the fourth day after delivery. No plasmodia were found in her organs. *P falciparum* was first seen in the baby on the 22nd day

C. L.

BYRD (W) The Treatment of Chronic Benign Tertian Malaria with Smalarina Cremonese.—*Indian J Med. Res* 1928 Oct. Vol. 16 No 2. pp 347-355 [21 refs.] [Quinine & Malaria Enquiry Kasauli India.]

BONURA (Pietro) Distribuzione della malaria in provincia di Bologna quasi lo spetto di *Anopheles* riscontrate nelle zone malarigene.—*Arch Ital Sci Med Colon* 1928 Feb Vol. 9 No 2 pp. 84-95 With 2 maps in text. [Inst. of Trop Path. Univ., Bologna]

CAVALLINI (E.) & CRUCILLÀ (G) Insolazione e malaria.—*Ann di Med Nov e Coloz.* 1928. Nov-Dec. Year 34 Vol. 2. No 5-6 pp 336-338. [4 refs]

- CORTES (Narciso Alonso F.) Particulares aspectos de la endemia palúdica en Valladolid. Epidemia de Tordenillas.—*Medicina Paises Cálidos* Madrid 1929 Jan. Vol. No. 1 pp 20-47 With 15 text figs.
- DEUTSCH (H.) Das klinische Bild der angeborenen Form der Malaria.—*Arch. f. Schiff- u. Trop. Hyg* 1928. May Vol. 32 No. 5 pp 242-247 [4 refs]
- FERRARI (Antonino) A cura da malaria e sua prophylaxia domiciliar.—*Brasil-Médico* 1928. Nov 3 Vol. 4. No. 44 pp 1231-1233
- FRÖES (Hector) Importancia practica do methodo Cropper Fröes em malarologia.—*Brasil-Médico* 1928 June 23 Vol. 42. No. 5 pp. 675-676
- Curva microlymphocytaria no impaludismo agudo. Nota prévia.—*Arch. Brasileiras de Med* 1928 Oct Vol. 18. No. 10 pp 794-797 With 6 charts on 3 plates
- Curva do índice mínimo de concentração nycthemérica (I.U.C.N.) em dois casos do impaludismo agudo de forma mista (Vivax Falciparum).—*Brasil-Médico* 1928 Nov 3 Vol. 42 No. 44 pp. 1229-1231 With 2 charts in text [9 refs]
- HABERMANN (Rud.) & SERREVS (Sergius) Impfmalaria und hämatopoetisches System.—*Ann. R. Soc.* 1928 Sept 16 Vol. 7 No. 38. pp. 1823-1833 [9 refs]
- MEINIGER (T. H.) Two graves van Malana.—*Geograph. Tijdschr. v. Ned. Ind.* 1929 Jan 41 Vol. 89 No. 1 pp 59-60
- MILLAN MURROX (Jose) Un caso de urticaria palúdica.—*Medicina Paises Cálidos* Madrid 1929 Jan Vol. 2 No. 1 pp. 65-66
- MODONDI (E. M.) L'infuenza malarica nella città e nella provincia di Palermo nel quinquennio 1921-1925. Rilevi statistico-clinici.—*Pediatrics* 1928. Nov 1 Vol. 36 No. 21 pp 1149-1157 With 1 text fig. [Ann. Clin. Pediatr. I. in Palermo]
- PATTERSON (A. R.) Malaria and Development. the Report of the Malaria Commission of the League of Nations on Principles and Methods of Anti-Malarial Measures in Europe in Relation to Conditions in Kenya.—*Kenya & East Afr. n. J.* 1928 Nov Vol. 8 No. 8 pp. 51-281
- SEBASTI (Antonio) Importancia diagnostica della malaria.—*Malarologia* 1928 Jan 31 pp 68-72 [1 ref]
- SEVACHMAN (M.) [Malaria in the Lena Valley].—*Russian J. Trop. Med.* 1928 Vol. 6 No. 6 pp 352-354 [7 refs] [In Russian. English summary p. 354]
- TALLAFERRA (William H.) Some Serological Studies in Malaria.—*Amer. J. Pub. Health* 1928 June Vol. 18 No. 6 pp. 793-795 [9 refs]
- TRAUTMANN (Edgar) Die Behandlung des Kreislaufs bei der Impfmalaria.—*Deut. Med. Woch.* 1928 Dec 14 Vol. 54 No. 50 p 2101

CORRECTION

- JANCSÓ (Nikolaus) Experimentelle Untersuchungen ueber die Malaria Infektion des Anopheles und des Menschen beeinflussenden Umstände [Researches on the Circumstances influencing Malaria Infection of Anopheles and Man].—*Beihfte z. Arch. f. Schiff- u. Trop. Hyg* 1921 Vol. 23 Beiheft 2 pp. 5-48. With 9 text figs.

The abstract on work by JANCSÓ undertaken from 1901 to 1904 published in 1921 and appearing in this *Bulletin* for August, 1922, requires alteration. From 18 cases of tertian malaria 22 sets of *Anopheles maculipennis* were infected and inoculation [inoculation] by their means attempted into 22 persons of whom one became infected. From 13 cases of quartan malaria 18 sets of anopheles were infected, and "inoculation" attempted into 3 persons without effect. From 22 cases of subtertian malaria it was attempted to infect 69 sets of anopheles, and inoculation was essayed in 43 persons of whom 19 gave a positive result, crescents being first seen on the sixth or seventh day of infection. Detailed protocols giving the histories of donors mosquitoes and recipients are published.

LABORATORY REPORTS

GOLD COAST Annual Report of the Medical Research Institute, Gold Coast, from 1st April, 1926, to 31st March, 1927 (YOUNG (W. A.) Director)—Gold Coast Rep Med & San Dept for Year ended Apr 1926-Mar 1927 pp 47-92. With 3 plates.

The burden of this Report is Yellow Fever—*anceps salorum* *via* since before the appearance of its successor the eager and devoted study of this disease was destined to end in tragedy for the gifted author himself. Unrivalled opportunities for its study, were afforded by two epidemics and several smaller outbreaks, and seventeen very complete post mortem investigations of its pathology were carried out by the zealous author. The epidemics, as is emphasized occurred in inland towns. In not any case of the disease was any suspicion of a leptospira encountered indeed, the only leptospira known at present on the Gold Coast is the non pathogenous species homoeomorphic with *L. icterohaemorrhagiae* found in water. Other points emphasized are that Kroo people are not essential for an epidemic outbreak, that native women take and die from the disease that babies suffer from a mild form which may or may not turn out to confer immunity, that intimate association with native life in the native quarter—as, for example in missionary work—is a necessary condition of infection for Europeans that possibly the most definite symptom of the disease is albuminuria, and that leucocyte-counts are of no value in diagnosis. [The belief that the infection is restricted to man and mosquito is still maintained here the fact of the transmissibility to *Macacus* monkeys having not yet been discovered.] Finally the lamented author expresses an intuition of the existence of some definite relation between meteorological conditions and the development of the yellow fever virus in the mosquito. Near Accra an outbreak of relapsing fever was concomitant with the latter part of a yellow fever epidemic and this gives the occasion here for an elaborate differential diagnosis between the symptoms and the pathological phenomena of the two diseases. Furthermore attention is drawn at full length to a case diagnosed provisionally as yellow fever (not only clinically but also from the circumstance that the young patient came from a compound where two cases of that disease had occurred) which proved post mortem, to be a case of tuberculous septicaemia.

Some interesting observations on the subject of plague immunity and plague vaccine—which is now prepared locally—are recorded. The virulence of the plague bacillus is not affected by long cultivation (7-8 months) but virulent strains of the plague bacillus passed through an immunized *Cricetomys gambianus* (pouched rat) suffer distinct loss of virulence for this species and virulence is not regained in culture or in repeated passage through susceptible *Cricetomys*. The non virulent plague bacillus thus obtained though it is not innocuous has some interesting reactions of its own. a vaccine prepared from a virulent strain gives no protection against infection with this non-virulent strain and vice versa, a vaccine prepared from the non virulent strain imparts little or no protection against infection with the virulent strain but animals after their recovery from infection with a non-virulent strain are immune to the virulent strain. The killed non virulent organism, moreover has no immunizing property. The possible bearing of these observations on the course of human epidemics

- CORRÉS (Narciso Alonso F.) Particulares aspectos de la endemia palúdica en Valladolid. Epidemia de Torderillas.—*Medicina Pálida*. Cádiz. Madrid. 1922 Jan Vol 2 No 1 pp 20-47 With 15 text figs.
- DEUTSCH (B.) Das klinische Bild der angeborenen Form der Malaria.—*Arch f Schiff- u Trop Hyg* 1923 May Vol. 32 No 5 pp. 42-247 [4 refs.]
- FERRARI (Antonino) A cura da malaría e sua prophylaxia domiciliar.—*Brasil-Médico* 1923 Nov 3 Vol 42 No 44 pp 1231-1233
- FRÖES (Hector) Importancia practica do methodo Cropper Fröes em malarialogia.—*Brasil-Médico* 1923 June 23 Vol. 42. No 23. pp 675-676
- Curva macrolymphocytaria no impaludismo agudo. Nota prévia.—*Arch. B. sanitas de U d* 1923 Oct Vol 18. No. 10 pp 794-797 With 6 charts on 3 plates
- Curva do índice urmano de concentração nycthemérica (LUCN) em dois casos de impaludismo agudo de forma mista (*Plasmodium falciparum*).—*Brasil-Médico* 1923 Nov 3 Vol. 42 No. 44 pp. 1229-1231 With 2 charts in text [2 refs.]
- HÄRBERG (Rud.) & SERNIS (Sergius) Impimalaria und hämatopoetisches System.—*Arch. Hock* 1923 Sept 10 Vol. 7 No. 38. pp. 1833-1833 9 cts.
- MEINIGER (F. H.) Zwei gevallen von Malaria.—*Gesund. T. f. d. v. Nadel* Jedd. 1923 Jan 21 Vol 69 No 1 pp 39-40
- MILLAN Muñoz (Jose) Un caso d urtiaria palúdica.—*Medicina Pálida*. Cádiz. Madrid. 1922 Jan Vol 2 No 1 pp 65-66
- NOVAKI (E. M.) L'infessione malarica nella città nella provincia di Palermo nel quinquennio 1911-1923. Ricerche statistiche.—*Parassiti*. 1923 Nov 1 Vol 36 No 21 pp 1148-1157 With 1 text fig. [Lat. Clin. Pub. Lib. Univ. Palermo]
- PATERSON (A. R.) Malaria and Development: the Report of the Malaria Commission of the League of Nations on Principles and Methods of Anti-Malarial Measures in Europe in Relation to Conditions in Kenya.—*Arch. & East Africa Med. J.* 1923 Nov Vol. 5 No. 8 pp 151-181
- SERGI (Antonio) Importanza diagnostica della malaría.—*Malariaologi* 1923 Jan 31 pp 68-70 [1 ref.]
- SHVARCHAN (M.) [Malaria in the Lena Valley].—*Russian J. Trop. Med* 1923 Vol 6 N 6 pp 33-354 [7 refs.] [In Russian. English summary p 354.]
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Of 7 274 fleas collected from rats 4 956 were *Xenopsylla cheopis* 2,305 were *X. brasiliensis* and 13 were *Ctenocephalus canis*

Thirty five cases of blackwater fever are carefully recorded in methodical summary four (including 2 children) being in females The term of previous residence in the tropics ranged from many years to—in one case each—10 months 9 months and perhaps 8 months. In every case where an account of the onset could be obtained the initial phenomena were those of a malaria attack, and the existence of malaria was definitely proved in 14 cases by blood-examination after the appearance of haemoglobinuria In every case but one quinine seems to have been taken, but in 6 cases the amount was small, and in 7 cases it was taken after the occurrence of the preliminary rigor that presumably indicates active haemolysis.

The dermatology records include two cases of mycetoma, both with bright red granules in the discharge numerous cases of moniliasis of the tongue and the common existence of a local monilia-dermatitis clinically indistinguishable from that caused by tinea A skin affection in appearance very much like the maculo-anaesthetic type of leprosy is described by the name pseudo-leprosy as of common occurrence in young healthy males it is distinguished by a prolonged history with slow progress the absence of acid fast bacilli, no anidrosis and a different histology

The record of tumours consists of 15 cases of carcinoma (8 being epithelioma) 14 sarcoma, 4 melanoma, and 2 rodent ulcer

The entomologist's report is full of interesting detail. Of mosquito larvae collected by the sanitary inspectors about dwelling places more than half are *Aedes argenteus* and more than one-third are *Culex nebulosus* Much information is being accumulated about the endoparasites of bloodsucking flies particularly of natural infection of wild mosquitoes with filaria and malaria Of great importance is the series of 24 enlarged photographs showing the extraordinary variation in the number and distribution of the white scales of the abdominal vesture of *Aedes argenteus* (*Stegomyia fasciata*)—variations described in 1897 in the *Bulletin of Entomological Research* (see this Bulletin Vol. 25 p. 274) by Mrs. Summers CONNALL

A A

- i NIGERIA. Annual Report of the African Hospital Laboratory Lagos, 1927 [BUTLER (G. G.) Pathologist]—*Ann Med & San Rep Nigeria* 1927 Appendix C pp 59-76
- ii. — Annual Report on the African Hospital Laboratory Kaduna, 1927 [MORRISON (H.) Pathologist]—*Ibid* Appendix D pp 77-90 With 1 folding chart

i. The Lagos Hospital laboratory is worked by one medical officer with three native assistants in training The report is full of interesting detail, especially the summaries of post mortem examinations, which cannot however be abridged. In the course of 3 385 routine blood examinations malaria parasites were found in 30 per cent. microfilaria in about 3 per cent. trypanosomes in 5 cases and relapsing fever in 2 cases only 93.2 per cent. of the malaria parasites were subtertian and 6.7 per cent. quartan. Of 428 children examined irrespective of any illness 75 per cent. gave evidence of malaria in a single blood examination In 295 tests of native serums the Sachs-Georgi reaction was positive in 57 per cent. In the course of examinations of faeces

Entamoeba histolytica occurred in 7 per cent. of 527 natives and 7 per cent. of 488 Europeans ascaris in 71 per cent. and ancylostoma in 50 per cent. of the natives and taenia in 11 instances and *Schistosoma mansoni* in 4 instances among natives. The Lister Institute having reported evidence (by culture and agglutination tests) of Shiga, Flexner 1 (and other types) and Schmitz bacilli in dysenteric material from this laboratory isolated in 1926, the author is now able to affirm the existence of most types of bacillary dysentery in Lagos. Of 51 suspected stools examined in 1927 eleven have yielded organisms of the Shiga type, and eight organisms of the Flexner type. *Schistosoma haematobium* has been found in 5.5 per cent. of 499 urine examinations (but higher percentage was disclosed in the mortuary). The tubercle bacillus was detected in 18.99 per cent. of 295 specimens of native sputa. Carcinoma was confirmed microscopically in 8 cases, sarcoma in 4 and lymphosarcoma in 2 of the cancers 3 were primary of the liver and 1 of the stomach. Autopsied deaths from natural causes numbered 236—of which 15 per cent. were from disease of the respiratory organs (excluding tubercle) 15 per cent. dysentery and diarrhoea 14.4 per cent. tuberculosis 9 per cent. (including 5 aortic and 2 cardiac aneurysms) cardiovascular disease 8.4 per cent. disease of central nervous system 8 per cent. chronic nephritis—to name the most important. Among young infants the most frequent cause of death observed was bronchopneumonia.

For two years the author has been recording the weight of various viscera in West African negroes of 148 adult male brains the average weight is here recorded as 45.9 oz. and of 27 adult female brains 40.7 oz. The average weight of the thymus in four infants not exceeding a year is recorded as 0.68 oz. in nine young children between one and five years as 0.86 oz. and in six older children up to 15 years 1.12 oz.

ii. The laboratory of the Kaduna hospital is worked by the pathologist with two native African attendants. Besides interesting facts the report includes a comparison and critical appreciation of the Kahn test and is enlivened with some philosophy. In 1,519 examinations of native Africans blood subtertian parasites were found in 18 per cent. quartan in 1 per cent. and benign tertian in 0.1 per cent. microfilariae in nearly 1.5 per cent. and trypanosomes in two instances. Special notice is taken of a case of myeloid leucaemia in a native which the author thinks is a novel record. The Sachs-Georgi test was positive in 45.4 per cent. of 295 native cases, but the author proposes to use the Kahn test in future. *Schistosoma mansoni* was found in 4.8 per cent. of male and in 1.5 per cent. of female faeces in the course of 1,243 individual examinations and *S. haematobium* in 1.27 per cent. of 928 examinations of urine. The percentage of Taenia in the faecal examinations was 6.9 and of Ancylostoma 42.5 per cent. The tubercle bacillus occurred in 15.8 per cent. of 172 native sputa. One case of carcinoma and three cases of sarcoma—one of them in a boy of 18 years—were observed in local natives. Only 24 post mortem examinations were made the population being Moslem, so that it is only on a coroner's order or other extraordinary occasion that an autopsy is possible. Among the most interesting items are to be found (1) Two cases of carcinoma of the pancreas in comparatively young natives. (2) Traumatic rupture of a spleen 22 times normal size, where early scar tissue was observed at autopsy to have formed around the rupture. The victim had improved day by day under very strict conditions of

recumbent immobility and he would probably have recovered had he not been so over-confident as to disregard those conditions in a fatal unwatched moment after he had been in hospital for a fortnight (3) A fatal case of malignant malaria where in a count of 500 red cells 34 per cent were parasitized multiple ring infection all stages of schizogony and numerous crescents being evident. Post mortem the abdominal cavity was dried up the peritoneum like thin parchment and the viscera except liver and spleen pallid. The liver and spleen were full of malaria pigment the liver almost black and the spleen a shapeless mass of stuff so friable as hardly to furnish a piece suitable for sections. (4) A fatal case of cerebral haemorrhage in a Hausa 25 years of age the liver showed cirrhosis and the kidneys a general early fibrosis and all the signs of chronic interstitial nephritis.

A. A.

SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH Annual Report
for the Year ended 31st December, 1927 [LISTER (F S)]—83 pp
With 2 charts & 1 plate 1928. Johannesburg

The total expenditure of the year (in round numbers) was £42 000 of which £15,883 was for the Research Division which includes separate research departments of bacteriology parasitology, entomology biochemistry and pathology

Researches in bacteriology comprise various aspects of plague tuberculosis hay fever the bacilli of pneumonia and cerebro-spinal meningitis and certain specific effects of inhalation of dust. Experiments to determine the destructive significance of the Tiger River virus for pestiferous gerbilles proved that it is a good food poison but showed no evidence of ability to cause an epizootic—an experience parallel with that of D HERELLE in a campaign against field mice in France with *Bacillus typhus murum*. In laboratory experiments the value of the bacteriophage of D HERELLE in the treatment of plague also accorded with the conclusions of that observer single inoculations did not impart immunity though repeated doses did to some extent and as a therapeutic agent it was capricious. Investigations of sputa showed that tuberculosis in South African natives is always caused by bacilli of human, not bovine type extensive study of the pathological lesions found in native sufferers is proceeding. The principal local agents in hay fever are discovered to be pollens of grasses—particularly the common tall veldt grass *Eragrostis plana* and the ubiquitous fodder grass *Cynodon dactylon*—and of various Compositae treatment by extracts of these pollens has been on the whole very satisfactory. Persistent taxonomic study (of itself now regarded as of merely academic value) of the types and groups of bacteria of the lobar pneumonia and cerebro-spinal fever of South African miners has disclosed the most interesting fact of continuous variation of both pneumococcus and meningococcus. There is a tendency for the recognized strains of former years to disappear and to be replaced by aberrant strains moreover a careful study of many old cultures of the pneumococcus revealed alterations of their form specific powers, and virulence. Experiments on dust-inhalation show that in animals exposed to clouds of amorphous silica dust laden cells accumulate on the walls of the alveoli where they may either be absorbed or set up fibrosis. Experiments arising out of evidence that certain workers in asbestos show unusual liability to tuberculosis may be noticed here—

sarcoma in 29 *Giardia* in 71 *Chilomastix* in 7 and other flagellates in 53. Multiple infections were very common. In the pathological departments *sarcoma* was recognized in 21 and *carcinoma* in 5 native Africans.

A. A.

VAN DEN BRASDEN (F) Rapport sur le fonctionnement du laboratoire de Léopoldville durant l'année 1926. [Leopoldville Laboratory Report for 1926. — *Ann Soc Belge de Méd. Trop* 1928. Sept. Vol. 8. No. 2 pp. 189-218.

During the year 1926 the number of examinations for detecting trypanosomiasis was 8,191. 161 new cases were admitted to the trypanosomiasis lazaret, and 55 new cases had ambulatory treatment. Since the introduction of the trypanamide treatment the whole aspect of the lazaret has changed the number of bed-ridden and tremulous cachectic, and demented cases being much less moreover the percentage of cases apparently cured which in 1923 was 14.0, was increased to 55.0 in 1926. In the Leopoldville district where the whole population is officially examined every year the percentage of infections diagnosed, which in 1920 was 2.0 was decreased in 1928 to 0.7. Among trypanocidal drugs tested were antimosan (Heyden 661), 270 Fournau, acetylarsan, and in prophylaxis Bayer 205. The watery solution of antimosan is neutral and therefore is painless in subcutaneous and intramuscular injection. Its action, which is transient, is less energetic than that of tartar emetic. In chronic cases it aggravates the general state. It was tested in 8 cases. Fournau 270 was tested in 14 cases in a 20 per cent watery solution, individual cases receiving from 15 to 28.5 gm., intravena in weekly doses of 1 to 2 gm. one case died during treatment but not from the effects of the arsenic component, two cases complained of headache, and three complained of rather persistent disturbances of vision. In two cases the spinal fluid became quite normal. In chronic cases its effects are comparable with those of trypanamide. Acetylarsan, which is "véritablement indolore" by subcutaneous and intramuscular injection, was tried in 10 cases, of which, in the course of treatment two died of sleeping sickness, and a third of some inter-current disease and one became too ill to finish the treatment, the course of treatment being 12 gm. in eighteen weekly injections of 0.75 gm. In the remaining 6 cases the general condition was improved and the lymphocytosis of the spinal fluid diminished, the fluid in one case becoming nearly normal. Bayer 205 was employed as a prophylactic in two small villages having a combined population of 183 souls. After removal of the individuals, 17 in number discovered at the preliminary examination to be infected, the other inhabitants received in the case of each adult, two injections of 2 gm., and in the case of each child two injections of 0.5 to 0.1 gm. according to age—this was in 1925. Since then the inhabitants have been re-examined once again in 1925 and twice during 1928 with the result of finding only 3 infected individuals.

In 94 voluntary-sought examinations of sputa the bacillus of tuberculosis was found in 36 cases, and in the antituberculosis dispensary there were 53 new admissions which were treated mostly by a porcelain-filtered bouillon-culture of the bacillus with good results. In early cases 200 newborn children were vaccinated against the disease. Noteworthy features of 358 examinations are the frequent finding (14 instances) of *Balantidium* and the

prevalence (60 instances) of hookworm above all other worms. Anti pneumococcus (32 610 doses) and antimeningococcus (19 165 doses) vaccines were largely employed the former in prophylaxis. At one camp of recruits the annual mortality from pneumonia has decreased since its use. In two other camps one with a population of 7 197 vaccinated, the other with a population of 7 322 unvaccinated, the latter was the more affected by pneumonia—258 cases against 183 cases but of course other circumstances have also to be considered in such a rough comparison. An interesting contribution to the question of congenital malaria is reported from Leopoldville of 55 native women brought to bed 31 were infected with the *Plasmodium* but in not one case was the newborn infant infected in one case however trophozoites and gametocytes were found in the placental blood. A case of bronchitis due to an *Aspergillus* is recorded.

A A

WANSFIELD-ADERS (W) *Annual Report of the Biological Division for 1927—Zanzibar Protectorate Ann Rep on the Med San & Biol Divisions for Year 1927* Section IX. pp 49-78

This report is devoted to the interests of the local sanitary department 24 of its 30 pages being occupied by details of helminthology surveys and the other 6 pages by details of fleas found on local rats. Of the 24 pages of helminthology 20 contain information regarding the local incidence and propagation of hookworm. The local incidence is estimated at 83 per cent estimated (by smear and flotation) from groups of natives from various parts of the Protectorate. *Necator americanus* (92 per cent) is the prevalent species, against 8 per cent of *Ancylostoma duodenale*. Soil pollution is rife throughout the Protectorate and is widespread, since the natives do not set apart common easing grounds. It is thought probable that the native has acquired some sort of tolerance of the infestation but generally persons showing over 10 000 ova per gramme [of faex] reveal clinical symptoms. *A. caninum* and *A. brasiliense* are very common in dogs. *Ascaris lumbricoides* is prevalent throughout the Protectorate and *Trichuris* in Zanzibar. Tape-worm is barely known. *Schistosoma hematobium* is commoner than had been thought, and cercariae having all the structural characters of that species were found in nine of 249 individual dissections of the local *Isodora ovoidea*, a snail found in most of the ponds and swamps of the island. Two cases of infestation with *S. mansoni* were observed, both persons being from the mainland.

The black rat and its variety *frugivorus* the brown rat and its variety *hibernicus* and *Cricetomys gambianus* have been identified from captures made in the town of Zanzibar. The commonest rat flea is *Yenopsylla cheopis*. *Y. brasiliensis* is not uncommon but *X. astia* is very rare. *A. crinita* was found on *Cricetomys*.

A A

SERGEANT (Edmond) *Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1927* [Report of the Algerian Pasteur Institute for 1927]—*Arch Inst Pasteur d'Algérie* 1928. Mar Vol. 6 No 1 pp 47-84 [48 refs]

The first twenty pages of this report form a brief review of original investigations concluded during the year the results of which included

ameba in 29 *Giardia* in 71 *Chilomastix* in 7 and other flagellates in 53. Multiple infections were very common. In the pathological departments sarcoma was recognized in 21 and carcinoma in 5 native Africans.

A. A.

VAN DEN BRANDEN (F) Rapport sur le fonctionnement du laboratoire de Léopoldville durant l'année 1926. [Leopoldville Laboratory Report for 1926. — *Ann. Soc. Belge de Méd. Trop.* 1928. Sept. Vol. 8 No 2 pp. 189-218]

During the year 1926 the number of examinations for detecting trypanosomiasis was 8191. 161 new cases were admitted to the trypanosomiasis lazaret and 55 new cases had ambulatory treatment. Since the introduction of the trypanamide treatment the whole aspect of the lazaret has changed, the number of bed-ridden and tremulous cachectic and demented cases being much less; moreover the percentage of cases apparently cured, which in 1923 was 14.0, was increased to 53.0 in 1926. In the Leopoldville district where the whole population is officially examined every year the percentage of infections diagnosed, which in 1920 was 2.0, was decreased in 1926 to 0.7. Among trypanocidal drugs tested were antimosan (Heyden 661), 270 Fourneau, acetylarsan, and, in prophylaxis, Bayer 205. The watery solution of antimosan is neutral and therefore is painless in subcutaneous and intramuscular injection. Its action, which is transient, is less energetic than that of tartar emetic. In chronic cases it aggravates the general state. It was tested in 8 cases. Fourneau 270 was tested in 14 cases in a 20 per cent watery solution, individual cases receiving from 15 to 28.5 gm. miravens in weekly doses of 1 to 2 gm. one case died during treatment but not from the effects of the arsenic component, two cases complained of headache and three complained of rather persistent disturbances of vision. In two cases the spinal fluid became quite normal. In chronic cases its effects are comparable with those of trypanamide. Acetylarsan, which is "véritablement indolore" by subcutaneous and intramuscular injection was tried in 10 cases, of which, in the course of treatment, two died of sleeping sickness, and a third of some inter-current disease and one became too ill to finish the treatment the course of treatment being 12 gm. in eighteen weekly injections of 0.75 gm. In the remaining 6 cases the general condition was improved and the lymphocytosis of the spinal fluid diminished, the fluid in one case becoming nearly normal. Bayer 205 was employed as a prophylactic in two small villages having a combined population of 183 souls. After removal of the individuals, 17 in number discovered at the preliminary examination to be infected, the other inhabitants received in the case of each adult two injections of 2 gm., and in the case of each child two injections of 0.5 to 0.1 gm. according to age—thus was in 1925. Since then the inhabitants have been re-examined once again in 1925 and twice during 1926, with the result of finding only 3 infected individuals.

In 94 voluntary-sought examinations of sputa the bacillus of tuberculosis was found in 36 cases, and in the antituberculosis dispensary there were 53 new admissions, which were treated mostly by a porcelain-filtered bouillon-culture of the bacillus with good results. In early cases 200 newborn children were vaccinated against the disease. Noteworthy features of 358 examinations are the frequent finding (14 instances) of *Balantidium* and the

diagnostic laboratory procedure. Many of the investigations mentioned have been already published and others are in progress. The director treats critically and with detail of the important results which have been attained.

1 *Plague* The epidemiology of plague in Bombay city presents most interesting features. The annual human mortality from plague in Bombay is steadily decreasing and the immunity of the Bombay rat is as steadily increasing. This immunity appears to be an inherited character as the progeny of the Bombay rat show a high grade of immunity. There seems to be no flaw in the argument for the comparison is directly made with the same rat from the locality of Madras where there is little or no plague and the rats show a high proportional susceptibility to infection. Chemotherapy in plague does not appear to have made much progress and although chemical compounds have been found which are highly bactericidal *in vitro* they are ineffective when introduced into the blood stream. Much attention has been concentrated on the application in plague of bacteriophage treatment but the results cannot yet be said to have been successful. The manufacture of plague vaccine is very thoroughly organized and standardized. A standard nutrient broth medium and highly virulent seed organisms are used. Standardization is carried to the length of gauging the potency of each brew of vaccine upon rats before issue. The antigenic quality of plague strains varies considerably and attention is paid especially to the elimination of rough colonies. The possibility of usefulness of a serum therapy has evidently not been abandoned and a serum has been obtained recently which saves the lives of 80 per cent of plague infected rabbits.

2 *Basal metabolism* The enquiry into the normal rate for Indians is in progress. So far results point to a rate 10 to 23 per cent below European and American standards.

3 *Sprue* The work on sprue has been continuous in the laboratory for many years past. Some of the more recent findings appear to show that the pancreas as far as its external secretion is concerned, functions normally in sprue and that the liver is not affected in sprue to such an extent as to show impairment by liver function tests.

4 *Schistosomiasis* The human disease is not endemic in India, but much valuable research has been conducted in India at the Bombay laboratory in regard to the analogous disease caused in herbivorous animals by *Schistosoma spindalis*. As this disease is solely an animal affection it lends itself especially to the testing of immunity and curative remedies. Some of these researches have already appeared and others are to be published in due time.

In reviewing this report one has only been able to indicate in a general way the nature of its contents.

W F Harvey

FEDERATED MALAY STATES. *Annual Report of the Institute for Medical Research for the Year 1927* [DOWDEN (R.) P.M.O.]—*Federated Malay States Ann Rep Med Dept Year 1927* Appendix A. pp 32-57

There is much good pasture here. Naturally beriberi comes first, with remarks upon the effect of the destruction of market-gardens (first by floods and then by drought) upon the incitement of the disease and with a brief account of the manufacture and experimental testing

of vitamin B extracts. A good deal is to be found on the treatment of malaria. Plasmochin in 0.03 gm. pill twice a day was tested on 46 cases of benign tertian, 10 cases of quartan, and 29 cases of subtertian. In the benign tertian cases the parasites disappeared by the 4th day in one case only remaining until the 5th day (one trophozoite found) and in the quartan cases they disappeared on the 5th day. In the subtertian cases the results are described as disappointing in the matter of treatment although the drug "appears to have the unique and valuable property of destroying subtertian gametocytes." Although plasmochin has the advantage of being tasteless it is more toxic than quinine, cyanosis being the commonest symptom. In two cases high fever and collapse followed its use and in one case diarrhoea, vomiting, and pain in the belly. It can therefore be given only under medical supervision. Results of treatment with radium-quinine (12 cases) and with methylene-blue quinine (11 cases) are tabulated: neither drug appeared to be efficacious and the plasmodicidal action [of both] is disappointing. In the diagnosis of malaria by precipitation tests the antigen prepared by the TALLAFERRO method was not pleasing, but an antigen prepared from alcoholic extract of the ether-insoluble residue of infected spleen-pulp gave more success—the precipitate formed when the alcoholic extract was set on ice being taken up with saline after separation.

In the treatment of tuberculosis sanocrysin was tested in 11 cases. The conclusions are that in early pulmonary cases it is better borne and may be followed by striking improvement, but that in advanced cases it may cause severe reactions which are likely to accelerate the course of the disease. Two cases of cervical adenitis were not improved.

In the treatment of bacillary dysentery D'HERELLE himself concluded that the results with a stock bacteriophage were "somewhat disappointing" in local cases and he therefore suggested the manufacture of a polyvalent preparation by isolation of numerous bacteriophages of local Flexner strains.

Ephedrine was tested in the treatment of asthma and of hay-fever. In six of 10 asthma cases it gave complete temporary relief, but half the patients suffered from its toxic effects. In hay fever when directly applied in 3 per cent. solution it gave immediate temporary relief.

In grave cases of secondary anaemia the effect of liver extract (bullock) was not magical, but was better than that of iron and arsenic.

Among numerous suggestive laboratory studies the following may be mentioned. Attempts to follow the virus of tropical typhus in guinea-pigs have been inconclusive but attempts to infect other laboratory animals have been encouraging in the case of the rat. Two probable cases of Japanese river fever were observed and on about 300 rats, of which 95 came from the plantation that furnished one of these cases. Trombiculae of 4 species—*T. deliensis*, *T. oudemansi*, *T. parashamushi*, and *T. minor*—were found, the first of which is known to carry the disease in Sumatra. In laboratory experiments to determine the survival of *Bact. typhosum* and of the vibrio of cholera in heavily dosed specimens of local waters kept in flasks in diffused daylight at room temperature sub-cultures made at 12-hour intervals showed the survival of the former for 4 days and of the latter for 3 days. In experimenting for a sign for the recognition of *Bact. typhosum* carriers, a well circumscribed zone of oedema and hyperaemia, of definite evolution and duration was developed, in the case of a carrier by

intradermal injection of 0.2 cc. of a 1 per cent dilution of a filtrate (stored on ice) of a 7-days-incubated broth-culture of the bacillus though the observations made are stated to be too few to justify conclusions as to the value of the test.

Among other items to which attention may be directed are a case of antrum, a case of *Bacillus violaceus* infection a case of black tongue a case of intestinal myiasis (rat tailed larva of *Eristalis*) a case of an unusual intestinal ulceration and a case of leishmaniasis also to remarks on attempts to sterilize a *Bact. typhosum* carrier to an investigation of the nature and incidence of broncho-pulmonary spirochaetosis spirochaete gangrene having been observed post-mortem in 20 out of 101 deaths from pneumonia to attempts to elucidate the mode of infection in leprosy to unsuccessful attempts to convey the virus of leptospirosis between guineapigs by means of *Aedes argenteus* and *albopictus* to unsuccessful attempts to infect monkeys with the virus of measles and to remarks on an outbreak of variola in Selangor in which many features closely resembled those described as characteristic of alastrim. There are again some observations of melioidosis the bacillus of which it is stated survives for some weeks in pond water and also is very resistant to desiccation and sensitive to heat.

Sixty two patients underwent the full course of Pasteur treatment for rabies and 12 more at two outstations there was no death 322 dogs had protective inoculation.

Malignant tumours were identified in 79 Chinamen 28 Tamils 1 Japanese 1 Sikh and 7 Malays.

A A

ARCHIVES DES INSTITUTS PASTEUR D INDOCHINE 1926 Apr-Oct
No 3 & 4 pp 155-175 —Services pratiques des Instituts Pasteur
d'Indochine en 1925 [Report of the Pasteur Institutes of Indo-
China for 1925.]

This is the report of the Pasteur Institutes at Saigon and at Nhatrang for the year 1925. The prevalent diseases at Saigon as confirmed by laboratory diagnosis were syphilis intestinal helminthiasis dysentery (predominantly amoebic) and malarial fevers. Tuberculosis is very frequent in the towns where 6,315 children were vaccinated against the disease. Of 205 examinations of leprosy matter 77 were positive. One hundred and sixty malignant tumours were diagnosed microscopically 54 cases of diphtheria and 45 cases of Vincent's angina were detected. Of 1,278 applicants 1,112 (including 180 Europeans) received the complete treatment for rabies all but 28 being the result of dog bite 2 persons died after treatment. More than 4½ million doses of anti variola vaccine were distributed and 50,000 doses of dry vaccine. The chemists department at Saigon includes not only biochemistry and food analysis, but a department of rubber research also.

The Institute at Nhatrang is concerned exclusively with the study of the diseases of animals the preparation of veterinary vaccines and therapeutic serums and the training of veterinary subordinates.

A. A.

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in all cases within 30 days from the commencement of the cure 12,809 pathological specimens were examined for diagnostic purposes. The quantities of various sera and vaccines issued by the institutes are mentioned.

W J Bais

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH INDIE 1928 Vol. 68 No 3 pp 362-381 [20 refs]—Uit het Jaarverslag van het Geneeskundig Laboratorium over 1927 [Annual Report of the Medical Laboratory, Weltevreden, Java, for 1927]

The bulk of this report deals with the routine work of the laboratory. The following subjects deserve special mention.

An experiment with prophylactic antidyenteric vaccination (for malined vaccine) in a lunatic asylum gave no distinct results but the number of cases was too small to allow any conclusions.

Various samples of native toilet powder contained lead.

Clinical thermometers though originally free from error probably suffer from continued use in the tropics.

In two goitre districts in the mountainous parts of Java iodized cooking salt was brought on the market under the control of the laboratory.

A list is given of the various concentrated anti-beriberi vitamin preparations supplied by the laboratory.

Experiments with the purified anti beriberi vitamin showed that this is not sufficient to obtain normal growth of the experimental animals a result in accordance with those obtained in other ways by British and American authors.

Basal metabolism was found to be lower in the tropics than in Europe.

Various other subjects have been dealt with elsewhere.

W J Bais

PALESTINE. Annual Report of the Laboratory Section, Department of Health Government of Palestine for the Year 1927 pp 63-74

This report contains a vast amount of multifarious statistics from which the following items of general interest are selected. In 23,923 blood examinations malaria parasites were found in 4,264 instances, namely *Plasmodium vivax* in 2,636 *P. malariae* in 1,489 and *P. falciparum* in 139. In 19,532 urines *Schistosoma haematobium* was found in 34 the local distribution of its intermediary host *Isodora truncata* was investigated. In 2,971 sputa the tubercle bacillus was present in 674. In 2,780 pharyngeal swabs the leprosy bacillus was found in 46. The intestinal parasites found in 20,762 samples of faeces were the usual species of ascaris in 774 whip-worm in 1,659 thread worm in 100 ancylostoma in 58 dibothriocephalus in 11 tapeworm (*saginata*) in 219 and hymenolepis in 108, and *S. histosoma mansoni* in 13. *Entamoeba histolytica* active forms in 1,377 and cysts in 232. *Giardia* in 383 *Chilomastix* in 1 *Trichomonas* in 756 also the Shiga bacillus in 135 the Flexner bacillus in 335 *Bact. typhosum* in 120 *paratyphosum* 4 in 19 and *B* in 20. Antirabic virus was

distributed to 10 subsidiary centres in all 788 persons were treated, with no failure and no accident. Of 37,328 primary antivaricella vaccinations 88 per cent. were successful.

A. A.

- i. MEAK (Walter) Banes Laboratory Report—1927 Additional and Explanatory Notes to the Consolidated Laboratory Report.—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Eastern Uss.* 1927 pp. 254-261 (United Fruit Co. Hosp., Banes, Cuba).
- ii. McDANIEL (James C.) Condensed Summary of the Laboratory Work done in Tela Railroad Company Hospital during 1927—*Ibid.* p. 263 1 ref.

i. The malaria parasite rate disclosed in April-May (at close of the harvest season) was positive in 48 per cent. of 628 negroes examined and in 18 per cent. of 50 Cubans and Spaniards in 82 per cent. of the infected negroes and in 37 per cent. of the infected Cubans and Spaniards the parasite was the *aestivo-autumnal* in September-October (just before the onset of the rainy season) the rate was positive in 22.3 per cent. of 139 negroes examined and in 9.6 per cent. of 208 Cubans and Spaniards, the *aestivo-autumnal* parasite occurring in 60 per cent. of the infected negroes and in 40 per cent. of the infected Cubans and Spaniards the reduction of malaria cases towards October is attributed to the long dry season the use of quinine anti-mosquito measures and changes in the general conditions of life. Examination of stools of 139 unselected hospital cases disclosed protozoa in 41 per cent. namely *Entamoeba histolytica* in 24 cases *E. coli* in 18, *Endolimax nana* in 20 *Iodamoeba bütschlii* in 8 *Chilomastix mesnili* in 3 *Trichomonas* in 3 *Giardia lamblia* in 6 besides unidentified forms in 3. Simple films of 2,330 specimens of emulsified stools examined in the laboratory routine showed hookworm infestation in 12.7 per cent. *Trichocephalus* in 22.2 per cent. and *Ascaris* in 18.6 per cent. Meinkock's turbidity test for syphilis and yaws was positive in 50 (apart from 11 ill-defined reactions) of 258 Haitian negroes and in 23 (apart from 7 ill-defined reactions) of 116 other negroes in 194 Cubans and Spaniards (no clinical yaws) there were 6 positive and 6 ill-defined reactions. Typhoid fever is not uncommon in the native population but is rarely observed in Haitian negroes. In a (fatal) Cuban case from which *Bact. paratyphosum* was recovered an abscess was found in a slightly enlarged spleen. The importance of blood culture in puzzling cases of fever is illustrated in a preliminary diagnosis of haemoglobinuric fever of a case where the blood culture became positive for *Bact. typhosum*. Among a few sporadic occurrences of bacillary dysentery Flexner's bacillus was recognized in 2 cases and the *V. bacillus* in 1. Contagious impetigo is said to be frequent and staphylo- and streptococcus have been cultured from the unbroken vesicles. *Tinea flava* is seen more frequently than *T. alba* and *T. nigra*. The diphtheria bacillus has been observed twice in throat cases.

ii. In the area surveyed in this report diphtheria had been almost non-existent and very few calls for throat cultures had ever been made. Following the discovery of a case of that disease an investigation of throat lesions was started in the course of which 145 cultures were made and among them 10 were positive for *C. diphtheriae*.

A. A.

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND
HYGIENE 1928 June 30 Vol 22. No 1 pp 1-8 With
3 text figs. & 1 plate **Laboratory Meeting**

At this laboratory meeting Colonel A. C. H. CRAIG exhibited sections showing remarkable pathological changes in the male breast among them one of diffuse interstitial mastitis and one of spheroidal-cell carcinoma. Among Dr E. HINDLE's exhibits were (1) Sections of skin of a hamster infected with the parasite of Chinese kala azar demonstrating (a) the large accumulations of parasites in the subdermal tissues and (b) a nodule in which the general appearance and distribution of the parasites were practically identical with the lesions of oriental sore (2) specimens illustrating the effects of *Leishmania infantum* infection on hamsters (*Cricetus griseus* and *C. triton*) namely to begin with a temporary infestation of viscera (liver and spleen) and afterwards a permanent and exclusive migration to the testes or to the joints of the feet and the tail Dr D KEILY showed preparations of protozoa parasitic in various dipterous larvae Colonel Clayton LANE exhibited apparatus for culture and observation of hookworm larvae including demonstration of a new method for determining the longevity of the larvae in soil Dr Alan MCKENZIE showed a portable dark-ground illumination apparatus. Dr P. H. MANSON BARR's exhibits included (a) photographs of a case of *Myxosis fungoides* a chronic and usually fatal skin disease of which although it was first described in 1812, the cause is still unknown and (b) a blood film of benign tertian malaria overstained with Manson's stain showing small azurophil rings in the plasma of the red-cells—quite distinct from Schuffner's dots and supposed by Dr CRAIG to be excretions of the parasite—which cannot be demonstrated with Romanowsky stains Dr Uvedale OWEN showed photographs of oriental sores, of *Trypanosoma gambiense* rash and of leprosy rash showing its annular character Dr A. C. STEVENSON demonstrated *Leptospora* of infectious jaundice in tissues Dr J. G. THOMSON's exhibits were blood films showing (a) *tenuis* forms of malaria parasites and (b) Maurer's dots in *falciparum* infections Professor YORKE and Dr A. R. D. ADAMS demonstrated (a) extensive infection of skin with *Entamoeba histolytica* due to discharge from a liver abscess and (b) colloid cancer of the splenic flexure in a case of amoebic dysentery

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A. A.

on are we? Plague still costs this district about 500 lives every other year and appears to defeat us utterly. The Medical Officer turns to his hospital and dispensaries and tries to forget about plague in clinical work but just in proportion as he is a sound and thorough physician he soon becomes seriously worried by the amount of preventable disease he has to treat and by the poor physical condition in which his patients arrive in hospital and he now jumps to the other extreme and decides to become a sanitarian. He makes a generalization to the effect that the district must be cleaned up that he must get the District Administrative Officer to take up the question of refuse disposal latrines water supplies and housing generally. But when it comes to the point it is not so easy to see where or how to start. There are 10 000 huts scattered over an enormous district and poor huts at that no one knows how to build better huts at a reasonable cost he has no staff to help him in this reconditioning even if it were clear how it should be done then malaria becomes epidemic and he has his hands more than full over the length and breadth of his district. That is a picture of an average district, and the point which stands out is that no one single disease is prominent no single disease is holding the people down. Malaria, plague yaws, tuberculosis dysentery pneumonia and tapeworm are all playing a part. It is also to be noted that in the case of none of these diseases (save perhaps that of yaws and possibly tapeworm, and then only to a limited extent, in existing circumstances) can any marked control be readily effected by specific measures.

There follows an account of a district not in medical occupation with extracts from the diary of a sanitary survey. Here in the course of 21 days 920 patients were examined and full notes made 609 stools were scrutinized for hookworm with a positive percentage of 76 and 22.8 per cent. were diagnosed as suffering from pulmonary tuberculosis. The figures for yaws malaria, etc. are not given. Perusal of the diary leaves one with a picture of a vast amount of preventable disease.

The rest of the paper deals with the solution of the problems discussed. The number of medical officers has been increased and the provision of hospitals and dispensaries improved. The author regards hospitals as essential for humanitarian reasons and also because the diseases of a district must be investigated as an essential preliminary to the institution of preventive measures. Where possible two European nursing sisters are to be attached to each hospital after which the employment of native women as nurses and midwives will become possible. Discussing the staff and its standards, the author includes as essential a European Sanitary Inspector his initial duties will be to train native boys to make a door window bed, table chair simple roof a pit latrine and a rat proof grain store to simple designs also to lay bricks make a concrete floor and set out a simple house to a standard design. The function of the native sanitary assistants thus trained is to guide the domestic revolution spoken of above in safe channels and check a tendency toward the development of slums. For ill health in Africa as in Europe is primarily dependent neither on climate nor on country but rather on domestic circumstances and the major campaign must be waged by means of education directed towards the improvement of domestic conditions. Summing up essentials, Dr Paterson writes —

It would appear that the minimum medical and sanitary service required for a large rural African native district [about 100 000] must consist of at least one District Medical Officer one Medical Officer of Health, one Dispensary Medical Officer two European Nursing Sisters one European Sanitary Inspector possibly European Hospital Assistant and Storekeeper a sufficient number of adequately trained and disciplined native subordinate

staff, a hospital with accommodation for about 100 patients, and from six to a dozen out-dispensaries and, as an essential part of the service reasonably good housing for the staff."

Finally the important question is discussed of subordinate African staff.

[In the discussion, which is worth reading, Professor STEPHENS said "In the case of large populations I do not think you can cure them without educating them first. It is worthy of note that competent thinkers in England have attributed the recent decline in infantile mortality not to the maternity and child welfare centres, but to the Education Act of 1870"]

A. G. B.

MORA (Antonio Damas) *L'assistance médicale indigène. [Medical Service for Native Peoples. —Bruxelles Méd 1928. Aug 12. Vol. 8. No 41 pp 1328-1337 Also in Bol de Assistência Méd aos Indígenas e da Luta contra a Malaria do Somo. Louanda. 1928. Jan.-Jun. Vol 2 Nos 1-8. pp 1-13. [1 ref.]*

The paper gives a general account of the Portuguese organization of medical service for the native population in their African colonies, and the author draws a sharp contrast between such methods and those adopted by the British. He says all those who took part in the League of Nations tour in 1926 were struck by the lack, in British Colonies of rural dispensaries of native sick nurses and of direct government provision for the medical needs of the natives. These things, the author says the British leave to missions and private enterprise their efforts being indirect aiming at health improvement through improved economic conditions. He gives prominence to a statement that the British have never been able, nor have they pretended, to assimilate native peoples. [That statement may be accepted, but what goes before is a quite inadequate indeed a misleading summary of British medical organization in tropical Africa.]

The system adopted by the Latin races is, says the author the ideal descendant of the colonizing methods of ancient Rome. "The Romans were *par excellence* the assimilators of peoples. On taking possession of a new country, they took command, organized, made roads, took part in all the details of the social life of the conquered, conferred legal rights upon all, the people becoming in two or three generations veritable Roman citizens. The author thinks such a system theoretically preferable. [Many will think that the Romans were assimilated by the peoples among whom they so industriously mixed themselves.]

The unit of the Portuguese organization is the rural dispensary with native sick nurse and consists of treatment room medical store, consultation room for the itinerant doctor and shacks for the convenience of patients who require to be kept near the sick-nurse. The whole of this unit is built in native fashion. The only cost to government is for medicaments food and the rest being brought by relatives.

A slightly more elaborate edition of the same thing serves for the more important villages and so by steps up to the great modern hospitals of the capitals. Curiously enough, the first example of the last to be quoted is the native hospital at Accra in the British Gold Coast Colony.]

J. F. C. H.

GILLET (H) La service médical des sociétés minières du Kasai. (Champs diamantifères du Kasai) [The Medical Service of the Mining Companies of the Kasai].—*Ann Soc. Belge de Méd Trop* 1928. Sept. Vol. 8. No 2 pp 233-249 With 12 figs. on 6 plates & 3 folding plans.

The Forminière Company started diamond mining in the Kasai in 1914 and doctors were employed in 1916 but it was not till 1920 that a medical service proper was created. It grew rapidly and in 1927 there were 13 doctors, 1 druggist, 10 agents sanitaires and 200 native infirmiers serving 20 hospitals or dispensaries 42 infirmaries (? sick wards) and one itinerant mission for the prophylaxis of sleeping sickness and this for an area of 40 000 square kilometres with 60 stations 400 Europeans 25 000 native labourers and 300 000 other natives.

The medical personnel however gives only a small part of its time to the employees of the various companies it treats all natives free and concerns itself with the prevention of the diseases which cause depopulation and ill-health in that region namely syphilis ankylostomiasis leprosy yaws smallpox and sleeping sickness. Owing to the temporary character of many of the stations the dispensaries and hospitals have to be simple and inexpensive in addition to being complete and well fitted. The mining areas are divided into medical sectors served by a doctor or agent sanitaire assisted by black infirmiers. Four points have to be considered—the area of the sectors the technical and scientific preparation of the medical personnel the quality of their equipment and the training of a sufficiency of infirmiers. Experience has shown that the care of 25 or 30 Europeans some with wives and children, and 2,000 or 3 000 native labourers collected in 6 or 8 stations on a system of 500 kilometres of motorable roads is as much as a doctor can undertake and he must be well trained, well assisted and well equipped. On their arrival in Africa the young doctors and agents sanitaires are posted to the native hospital at Tshikapa. Here the doctors who have previously taken the course at the school of tropical medicine in Brussels become acquainted practically with their duties and are saved the many mistakes they would make if they had to acquire each for himself a knowledge of medical practice in Africa. They learn hospital administration dieting of patients management of native personnel the examination and inspection of labourers and camps and the like. Two months of this training are more valuable than two years of painfully acquired experience. Hospitals and dispensaries as well as materials are standardized as far as possible. Each doctor is provided with a motor car and a first aid case containing all he wants for the immediate treatment of any disease.

In the school at Tshikapa the native infirmiers learn their work. The course is given in a native language lasts a year and consists of theoretical and practical instruction the latter comprising microscopic examination minor dressings administration of common drugs intravenous injections temperature taking and ward work. The results are described as encouraging but out of proportion to the trouble taken. The first difficulty is to recruit pupils capable of profiting from the instruction i.e. with knowledge of reading and writing and some guarantee of character. This overcome the course eliminates 80 per cent. of the selected. It is not difficult to teach the young native but to imbue him with notions of duty devotion to his work and initiative is another matter.

The Centres are standardized. The hospitals are of three types—(1) Native hospital with a good surgical installation a well-furnished laboratory of microscopy and biology and a dispensary. Its capacity is 100 beds. (2) the same installations but with capacity of 60 beds. Each of these is in the charge of a doctor. (3) Installation for minor surgery a small laboratory with microscope equipment for intravenous or other injections. capacity 20 patients. This type of hospital if managed by an infirmier is designated dispensary. The mining zone contains one hospital for Europeans (type 1) 1 for natives (type 1) these at Tshikapa. 7 of type 2 for natives. 11 of type 3 for natives and 42 infirmiers at the mines. Several of the hospitals are not yet finished, but all will be completed in 1929. The object is to treat the greatest number of curable cases rather than to do purely scientific work and it is gained by organization, specialization, and extensive employment of native infirmiers, and simplification and uniformity of treatment. The hygienic condition of the natives outside the circle of influence of the stations is bad. A table is given of the causes of mortality of 22,850 native labourers in 1927. There were 125 deaths. Of these 32 are attributed to cachexia with intestinal parasitism 16 to acute lung infections 16 to grippe 4 to tuberculosis and 38 to unknown causes (many of these probably grippe). Of the first we are told that the cachexia comes on suddenly without visible cause and is not influenced by treatment or diet. post mortem examination has failed to elucidate it. there is often ascites. The health of the camps is good. The occupants are medically examined when recruited and kept under medical supervision. treated promptly while cases of contagious disease are promptly recognized and isolated. The labour is recruited from the district, and is immune to the local viruses which explains the low proportion of pneumonias. Discipline is not too strict and the food is comparable with that of the villages from which the natives come though richer and more abundant. The Europeans are remarkably fit. malaria is mild, and amoebic dysentery remarkably so.

The rest of the paper deals with the organization of each Sector of sleeping sickness prophylaxis and with a hospital for incurables maintained by a mission and accommodating 120 patients. Here the victims of leprosy and sleeping sickness at the last stage will end their days. The illustrations give a good idea of the character of the buildings, simple plans of which are also shown.

A. G. B.

VAN RIEL. L'activité du centre médical de Tshikapa (Kasai) [The Work of the Medical Centre at Tshikapa (Kasai).]—*Ann. Soc. Belg. de Méd. Trop.* 1928. June. Vol. 8. No. 1. pp. 47-56.

Tshikapa (Chipaka of English maps) is the administrative centre of the mining companies in the Kasai District of Belgian Congo. Dating from 1920 it is now one of the large medical stations. The author has had three years experience there. He describes the native hospital, where in 1928 there were over 25 000 consultations, comprising both native mine employees and other natives. The employees are examined on engagement, measured and vaccinated, and re-examined monthly with their wives and children. Of 105 deaths in hospital in 1925 and 1926, 20 were due to trypanosomiasis 21 to pneumonia and 31 to

misère physiologique due chiefly to intestinal parasites ankylostomes or amoebae. The natives are examined for trypanosomiasis at the rate of 5 000 per month and the infected come readily for treatment by trypanamide or trypanarsyl. In routine examinations 236 cases have been detected by gland puncture and 43 by blood centrifugation treatment is controlled by lumbar puncture of which 523 have been done. Pneumonia is common but less so than in other parts of Tropical Africa pneumococcal complications are rare. Tuberculosis will soon the author says become one of the plagues of the country For intestinal parasites all patients are examined who have abdominal symptoms and also all hospital entrants. Of 2,237 stool examinations 1 397 were positive revealing ankylostomes in 30 per cent. amoebae and amoebic cysts [species not stated] 18 per cent. ascari 2.8 per cent. schistosoma [species not stated but the rectal form is named elsewhere] 1.1 per cent. Liver abscess has not been seen There are also many fatal cases of cachexia with ascites in which the author suspects a helminth etiology Enteric fever and bacillary dysentery are unknown. Malaria is frequent but mild. Only one case of relapsing fever has been seen in a woman from Angola though *O. moubata* is present. Smallpox has practically disappeared. Leprosy attacks about 3 per cent. of the native population. Yaws is rare in the camps and present in about 2 per cent. of the native population. Syphilis is prevalent in the camps. Both diseases are treated by Neo intravenously and Bi38 intramuscularly once a week in children stovarsol is as effective. Tropical ulcer is diminishing in frequency as hygienic conditions improve small ulcers are systematically sought and every tropical ulcer is treated in hospital. *Onchocerca voluulus* cysts and filarial itch are widespread. A list is given of surgical interventions 945 in all.

A. G. B.

LAURERRE (H.) Les oeuvres de sauvetage de l'enfance à Dakar
[Child Welfare at Dakar.]—*Bull. Soc. Path. Exot.* 1928 May 9
Vol. 21 No. 5 pp. 401-411

The measures comprise a native maternity centre pre-natal consultations a baby clinic gynaecological clinic and a crèche. The maternity centre inaugurated in 1919 contains 20 beds for lying in women and 10 for pregnant women at term. It is staffed by a qualified accoucheur two European midwives and a qualified native midwife from the Dakar Medical School. The pupil midwives assist. There are no infirmiers all the work being done by the midwives and their assistants. In 1927 there were 441 deliveries and if the accommodation were sufficient the number could be tripled. Outside the mortality amongst mothers and babies is extremely high. The mothers leave the maternity centre 11 days after delivery with a layette and 20 francs.

The personnel of the maternity centre provides for the pre-natal consultations which are welcomed by the native women in the year 1927 740 women were seen at 9 653 consultations.

The working of the baby clinic is described here, again, the mothers come very readily. The diseases chiefly met with are bronchitis gastro-enteritis stomatitis thrush, conjunctivitis, otitis media, pyoderma and, above all malaria and congenital syphilis. No precautions are taken by the natives against malaria, and the belief prevails among

whites as well as blacks that a nursing mother has only to take .25 or 0.5 gm. of quinine hydrochloride to protect her child. Congenital malaria, in the author's belief is frequent and generally overlooked to it be attributes the fever and gastro-intestinal symptoms which are so common amongst infants in Dakar. The remedy is a daily dose of quinine during pregnancy. As to syphilis, 45 per cent. of the children up to two years are said to die from it. The success of this clinic may be judged from the fact that in 1927 3,287 babies were seen at over 25 000 consultations.

At the gynaecological clinic the conditions most frequently met with are haemorrhage after delivery or miscarriage, puerperal infection, metritis, parametritis and vesico-vaginal fistula. over 13 000 women were treated in 1927. This is the centre also for antivenereal prophylaxis.

A. G. B.

LHUVIERRE (H.) Note sur le fonctionnement de l'Institut d'hygiène sociale de Dakar. [The Institute of Social Hygiene at Dakar.]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 329-334.

A further account is given of the working of this Institute, which came into being in June, 1921. It serves two purposes as a native dispensary, and as a school for native doctors and midwives. In 1927 there were 17 405 new patients and 87 723 consultations. The Institute comprises six services: general medicine special diseases (eye nose throat and ear mouth) antituberculosis service, antivenereal service service of baths and bacteriological laboratory. The Institute is responsible for the medical examination of the pupils of the municipal schools, of whom full physical records are kept. By its agency in the year 1927 1 732 vaccinations against tuberculosis were performed.

A. G. B.

COOK (Albert R.) Report of the Lady Coryndon Maternity Training School, Namirembe, 1927—*Uganda Protectorate Ann. Med. & Surg. Rep. for Year ended 31st December 1927* Appendix No. 1 pp. 81-86.

Dr Cook writes that in the Kingdom of Buganda, which contains the most enlightened people of the Protectorate the maternal mortality is estimated to be 4 per cent. or ten times the figure in England. The elimination of three factors would probably bring the Uganda mortality below the English figure, these being syphilis, contracted pelvis and native medicine. In syphilis antenatal treatment is having great success. Of contracted pelvis, Dr Cook writes—

The simple flat pelvis is the type most commonly met with, due to the practice of putting heavy loads of water pots or bananas on the heads of young girls when the pelvic bones are still plastic. The weight transmitted down the vertebral column forces the sacral promontory forwards and downwards and reduces the all-important anteroposterior diameter of the pelvis. As rickets is virtually unknown among the Baganda this factor is of considerable importance. About 18 per cent. of Baganda women show pelvic contraction.

The third factor is the most serious of the three. In almost all cases of impending delivery the old women prepare a decoction of native herbs with powerful oxytocic properties which the unfortunate patient

has to drink and in many instances a normal labour becomes a dangerous one. In a series of 19 deaths in labour 8 were attributed to the use of native medicines and in 4 instances the uterus was ruptured. The remedy is education.

A table shows that there were in 1927 23 000 out patient attendances at the training school 2 362 new patients 67 per cent. of whom had a history of syphilis and that 1 035 babies were born. Of in patients in the clinical wards attached to the training school there were 775 admitted during the year 589 confinements and 19 maternal deaths. In 15 Maternity Training School Country Centres there were 1 543 confinements with 1 444 living children and 9 maternal deaths. Thirty-two native students were in training at the School and 65 have qualified as midwives after a two-years course the service is popular. Full records are kept of all cases admitted. There is also a Maternity Training School at Nsambya of which details are given by the Revd. Mother M. KEVIN

A. G. B.

DAKE (W. J. L.) Die Bedeutung der Pathologie der Tropen für die Lehre der kosmopolitischen Krankheiten. [*The Significance of Tropical Pathology for the Study of Cosmopolitan Diseases.*]—*Wien Med. Woch.* 1928. Sept. 8. Vol. 78. No. 37 pp. 1160-1162. [10 refs.]

The author's text is a table of incidence of diseases seen in hospitals in Batavia and Sourabaya during three years which shows that some diseases frequent in Europe are in Java rare e.g. exophthalmic goitre was seen only four times in 47 000 patients. He surveys work done in the Dutch East Indies on the differences between the pathology of the temperate and tropical climates.

As to morphological differences the diameter of the aorta is less in the Malay than the European, 3.1 to 4.2 cm. and the thyroid is much smaller on the other hand, the hypophysis is larger in the Malay.

Several authors have made a study of the blood. The percentage of lymphocytes is high in Malays as are the numbers of red corpuscles and the haemoglobin (5,200 000 and 104 per cent. Sahli) the iron content is also higher. The cholesterol content is lower as has been shown to be the case in British India and Indo-China the residual nitrogen and urea are less the phosphorus more.

Gall-stones are rare in D.E.I. and when they occur the stones are in the bile-ducts, composed of bilirubin and poor in cholesterol thus DE LANGEN associates with the poverty of the blood in cholesterol and this again is probably associated with the cholesterol poor diet. Bladder stones however are not infrequent, another possible result of diet for it has been shown that a diet deficient in vitamin A will produce them in rats. He draws attention to the frequency of lobar pneumonia (2,214 cases in the 47 000) and to that of liver cirrhosis (150 cases) in the last alcohol plays no part. Liver carcinoma comes high among the malignant tumours and of these cases 90 per cent. have cirrhosis.

DE LANGEN believes that in tropical conditions there is greater irritability of the sympathetic nervous system to which he would attribute the rarity of gastric ulcer and gout. VAN LOON thinks that the neurasthenia of the tropics is shown much more than in Europe by somatic phenomena—abnormal secretion of sweat attacks of diarrhoea, rhinitis—which can be explained by heightened irritability or paralysis of the vegetative nervous system.

Obliteration of the vermiform appendix is common in Europe rare in Java. In a large proportion of native cases the natives had adopted European habits. In the mission hospital at Bandung the author had no cases of appendicitis among 5000 patients. The rarity of tabes and G.P. though syphilis is common, is again commented on. [Most of the papers referred to have been summarized in this Bulletin.]

A. G. B.

NOCHT (B.). Organisation und Arbeit des Instituts für Schiffs- und Tropenkrankheiten. [Organization and Work of the Institut für Schiffs- und Tropenkrankheiten.]—*Arch. Woch.* 1928. Sept. 18. Vol. 7 No. 38 pp. 1795-1799 With 1 text fig.

An account of the work of the several departments of the Hamburg Institute from 1905 to the present day. It is packed with information and will be useful for reference. Though Germany is without tropical possessions the Institute maintains its usefulness.

A. G. B.

STEPHENS (J. W. W.). The Functions of the Spleen.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927 Nov. 25. Vol. 21 No. 3 pp. 181-184. With 11 text figs. [51 refs.]

A presidential address packed with diverse, and often differing, observations on all phases of its subject. It is as little capable of summary as Bradshaw's Railway Guide. To indicate its scope it may be mentioned that the main headings are General Anatomy Circulation Haemopoiesis Haemolysis Splenomegaly Splenectomy.

A. G. B.

BARRETT (James W.) BALFOUR (Andrew) Tropical Australia. [Correspondence.—*Brit. Med. J.* 1927 Dec. 31 p. 1244 1928. Jan. 7 p. 30 May 5 & 19 p. 772, 875 July 28 p. 176 Nov. 3 p. 818]

This correspondence relates to Tropical Queensland. Sir James Barrett's thesis is that Queensland's experience, as far as it goes shows that one part at least of the tropics can be peopled by a white race and thus he attributes to the absence of a parasitized native population. As to heat, nearly three-quarters of a century of settlement in tropical Queensland indicates that no serious organic damage need be anticipated. Dr BALFOUR finds it difficult not to believe that tropical light and heat tend to affect deleteriously the nervous systems of northern European races constantly exposed to them. He has been told, however, that the white men who work in the cane fields are largely of Italian origin, and asks whether this is really the case.

Is there in the low lying region of tropical Queensland an example on a comparatively large scale of a colony of British-born settlers which has persisted without deterioration for three or four generations, and the male members of which have carried out manual labour in the open?

Sir James Barrett replies by giving the statistics of Italians or Italian-born persons in Queensland for the census years from 1871 to 1921 in which year it was 2.44 per mille, and that portion residing within

the tropics 8.37 per mille of the tropical population Dr Balfour being dissatisfied with his reply Sir James Barrett writes that the precise answer to his question cannot be given till the census of 1931 Dr CILENTO however informs him that in the tropical coastal belt of Queensland the population is 103 000 of which Italians [? and Italian born] formed less than 1 per cent. that is between 850 and 900 By 1927 however owing to American restrictions to immigration there were 7 000 more bringing the Italian component of the population to 7 per cent. On sugar production as a whole there are 30,250 men employed, and of these the Italians number 2 700 or about 9 per cent but up to 1921 sugar growing was conducted by Anglo-Saxon labour almost exclusively

A. G. B.

KONINGIN WILHELMINA JUBILEUM STICHTING Vierde jaarverslag 1927 [Queen Wilhelmina Jubilee Institution. Fourth Annual Report. 1927]—27 pp. G. Kolff & Co Batavia-Weltevreden.

This institution exists for the purpose of promoting scientific medical research in the Dutch East Indies especially in regard to the combating of endemic diseases. The Queen has given to it funds contributed by the population of the D.E.I. on the occasion of her jubilee coronation in 1923. The activities of the institution during 1927 are very briefly summarized. Subsidy was granted to workers in various branches of research (malaria control, tuberculosis of the throat, tropical ulcer, goitre, physiological subjects). For the prize subject, spread of tuberculosis in a limited free living population in a part of the D.E.I. five answers came in. Two prizes were granted, to Dr PANETH for his research among the Batak population in Sumatra and to Moh. DJAMIL, whose research concerned the population of two villages in the hills of West Sumatra. Both reports are to be published in detail. The Committee decided to have a medal made to be awarded to workers who distinguish themselves in the combating of endemic diseases.

W. J. Bais.

HÖTTE (F. A.) Koningin Wilhelmina Gasthuis voor Ooglijders te Bandoeng. Jaarverslag over 1927 [Queen Wilhelmina Hospital for Eye Patients at Bandoeng. Annual Report for 1927]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928 Vol. 68 No. 4 pp. 572-578.

6 402 patients were treated at the poly clinic with 38 019 consultations the average number of patients was 125 per day 1 174 operations were performed. By a temporary stitch through the M. rectus superior by paralyzing the m. orbicularis with novocain cutting the eyelashes short disinfecting the margin of the lids and continual dipping [? swabbing] of the conjunctival sac in order to keep it dry the danger of infection in cataract operation could be reduced to a minimum. Tarsoplasty is done after BLASCOVICS. No strabismus operation had to be done the natives do not ask for it. The late and neglected stages in which many cases come under treatment may be discouraging for the tropical ophthalmologist on the other hand, he can dispose of a large operative

material. The author finally shortly quotes the occurrence of a familiar type of degeneration of the cornea and a case of luxation of the lens as a sequel of trauma of the head.

W. J. BAX.

GALT (Curtis M.) Diseases Prevalent in Kintungkiang, Yunnan.—*China Med. J.* 1928. June. Vol. 42. No. 6. pp. 420-422.

The author refers to WATSON'S paper on medical practice in Yunnanfa [this *Bulletin*, Vol. 25 p. 368]. Kintungkiang is in south-western Yunnan on the banks of the Mekong river at 1,500 feet. Racially the population is Siamese. The diseases seen are vesical calculus (common) bronchial asthma (very common) measles, amoebic dysentery smallpox, malaria (very common) leprosy (very common) tuberculosis, rat bite fever (2 cases) acute rheumatism, godtre (fairly common) trachoma and cataract intestinal parasites are extremely common, especially tapeworm ascaris and hookworm but the eggs of the last are never numerous.

Diseases not seen lobar pneumonia, tonsillar disease, tetanus, epidemic meningitis, typhus, typhoid, relapsing fever cholera, plague, anterior polyomyelitis, epidemic encephalitis.

A. G. B.

BAKER (John R.) Depopulation in Espiritu Santo, New Hebrides.—*J. Roy. Anthropological Inst.* 1928. Jan.-June. Vol. 58. pp. 279-303. With 2 figs. & 1 plate. [7 refs.]

The author has paid two visits to this island, and spent the year 1927 in making a general study of it. He devoted particular attention to the Sakan peninsula, and traversed it in all directions mapping the existing and deserted village sites.

He found that the total population of Sakan was 691 but as no previous census has been made it is not possible to give any facts relating to the course of the depopulation but there is ample evidence that the decrease in the number of inhabitants has been very rapid and still progresses. In considering the cause of the depopulation, the author mentions the work of previous writers, some of whom gave currency to views which are obviously untenable. He believes that there are three principal factors (1) *Introduced diseases*—Measles, whooping cough and mumps reduced the population of two villages in West Santo from 278 to 32, and this instance does not stand alone. Other diseases believed to be introduced by shipping and frequently fatal, are influenza, dysentery and tuberculosis. Depopulation is very great in places where no foreign influence except introduced diseases has exerted itself (see below). (2) *Abortion*—Baker feels certain that this is commonly practised (and I entirely agree with him), but no one has produced direct evidence that it is so. The fact that there are only 128 living children per hundred adult females nearly all of whom are married, appears to confirm the general belief that abortion is commonly practised. (3) *High Sex Ratio*—In Sakan there are 159 males per 100 females, a ratio which is higher than any other on record, except the ratio of 161 in the Anir Islands, Bismarck Archipelago, recorded by PITT RIVERS. These abnormal sex-ratios, and other

recorded from many but not all parts of Melanesia are not due to female infanticide, for it is known that they exist at birth in certain islands they are clearly a potent cause of depopulation.

The author rejects the view propounded by RIVERS that the destruction of old customs and occupations produces apathy of which the people die. He is one of the few white men who have penetrated the heathen interior of the Sakau peninsula where there is no direct European influence of any kind, and there he found that there were 120 children per 100 adult women in contrast to this he found 164 children in the Christian villages where many of the old usages and amusements have been stamped out. He concludes that it is not loss of old customs which is causing the people of Santo to limit their families by abortion.

The whole paper is of great interest and value especially because the author has been at pains to collect facts rather than theories.

P. A. Buxton.

LAMBERT (S. M.) *Medical Conditions in the South Pacific.*—*Med J Australia* 1928, Sept. 22, 15th Year Vol 2, No 12, pp 362-378. With 6 graphs & 1 map.

For ten years Dr Lambert has served the International Health Board in the South Pacific, that is to say in those innumerable islands which lie south of the Line, to the east of New Guinea. In these years it is certain that he has travelled more widely than any other student of the health and welfare of the peoples of Melanesia and Polynesia and within his interests he includes not only many sides of medicine and practical hygiene but also an acquaintance with the anthropology and the work of early European travellers in the Pacific. In British Oceania he works as a friendly critic preserving an external point of view and in the paper before us he summarizes his observations and gives a general review of our problems successes and failures.

In the Pacific perhaps more than in any other part of the world, we may arrange our knowledge of disease and hygiene around human history and movements. In that part of the world with which Dr Lambert is concerned, there are two principal human races Melanesians towards the west and Polynesians in the centre of the Pacific. In nearly every respect these peoples present great contrasts to one another for the Melanesians speak a multitude of unrelated tongues and each community tends to live by itself quarantined from the next by differences of language and culture and by unseen barriers of magic and fear whereas Polynesians are one in race and spirit and until the coming of the European their unity was maintained by continual travelling and raiding. But though the races are so different they both came into Oceania from the west following several routes and in doing so they passed from a part of the world which is rich in diseases and parasites to a part which, even now is relatively free from both and as they crossed the ocean from archipelago to archipelago they shed some of the parasites and diseases. For instance when they crossed the sea between the New Hebrides and Fiji, roughly 170 east of Greenwich they left behind them *Anopheles* and *Plasmodium* at or about the same place they freed themselves of venereal granuloma. The same is true of food plants there is no sago or betel east of the Bismarcks and in the atolls of the central Pacific kava

yaws and many other crops will not grow. On the other hand, in all parts of Oceania *Necator* and *Trichuris* are universal and everywhere, with one possible exception the natives suffered from yaws.

There are it must be admitted, a few facts which cannot be explained in terms of human migration. One of these is the almost total absence of *Entamoeba histolytica* and of clinical amoebiasis from these countries [Dr Lambert is in error when he says that this condition occasionally occurs in Samoa] the absence of *Cestodes* and *Trichinella* is also unexplained indeed, it is most unexpected, for the early Melanesians and Polynesians possessed domestic dogs and pigs and a small rat travelled with them from island to island.

The Islanders lived with few diseases and parasites till the white man made his first settlements in the early years of the last century. He brought with him a number of diseases which we believe did not previously occur in Oceania and his arrival was followed by outbreaks of dysentery, measles and other exanthemata the tuberculosis, gonorrhoea, leprosy, and enteric were less apparent but none the less harmful to the native races. The economic development of Fiji, Tahiti, the New Hebrides and other islands was brought about by cheap Oriental labour and the Chinese, Indians and Annamites introduced leprosy, *Acanthamoeba* and *Ancylostoma*. Soon after the European arrived the native races began to decrease in numbers.

The Pacific of which Dr Lambert writes has passed that stage nearly everywhere the numbers of natives are increasing, or at least not decreasing. The introduced diseases are coming under the control of the foreigner's medicine and hygiene in the more enlightened parts of Polynesia there are organized campaigns against yaws, ankylostomiasis, and the maladies of infancy, and in many places a notable reduction in child mortality has followed. As the author points out the much-attacked Medical Department of Western Samoa planned and executed an admirable demonstration of preventive medicine and the country was reaping the results of it until the recent political trouble destroyed the work of several years.

In the south Pacific the administrator's greatest difficulty is that his people are scattered and live in minute communities the Fijians inhabit 250 islands and the atoll folk in the Ellice and Tokelau groups live on sand-banks each one fifty miles or so from the next. Under these circumstances it is impossible to provide an adequate medical service of Europeans and native medical practitioners have proved their worth for many years in Fiji. The custom has been to train these men for three years in the central hospital at Suva, and send them out to the districts on the whole they have a very good name among natives and Europeans in character and boldness they are utterly unlike the subordinate medical personnel of some other tropical countries. It is now some years since the value of men of this type was realized and the Rockefeller Foundation has associated itself with the local administrations in enlarging the buildings and the scope of the school attached to the Suva Hospital. The new buildings are now open they house forty students drawn from the seven important archipelagoes in Polynesia, and Melanesia. The men who have gone through the School will return to their homes, and are perhaps destined to be the most important liaison between white and brown races.

With these matters and many others Dr Lambert's paper deals, and on the whole it is a very well balanced summary. If we may criticize his work we should say that he gives currency to too many

generalizations and that his attitude is uncritical. The medical men in the Pacific are thinly spread over a vast area—few are in touch with centres of intellectual work and most are overwhelmed by their opportunities—some of the statements which appear in their reports require to be investigated before they are put into circulation. For instance it has often been stated, and Dr Lambert repeats it, that diphtheria occurs and is mild—but does it occur at all? What real grounds are there for thinking that New Caledonia and the New Hebrides have much amoebic dysentery? In one archipelago in the Central Pacific it is customary to excise enlarged glands, literally by the thousand—it is assumed that the glands are tuberculous [the reviewer believes that they are due to yaws] but it is not evident that smears or sections have been examined for the tubercle bacillus—we wish that Dr Lambert had boldly raised the question. CILEXTO'S figures from New Guinea are quoted as showing that in natives newly recruited for plantation work 5 per cent. had a positive von Pirquet reaction, and that the percentage rose (accurate to one place of decimals) and reached between 63 and 70 per cent. in those who had worked for the white man for ten years. But if one refers to the original paper it is not clear that all the facts were collected by one man, or from a homogeneous group of natives and as no original figures are quoted we are left to assume that these exact percentages are justifiable. Dr Lambert rightly calls attention to the urgent need for vital statistics properly collected—we feel that he would have conferred still more benefit had he laid bare some of the other gaps in our knowledge and some of the points where its foundations are insecure.

P. A. Buxton.

NICOLAS (Ch.) *Etude des causes de la disparition progressive d'une intéressante race d'indigènes* [*Study of Causes of Depopulation of New Caledonia.*—*Bull. Soc. Path. Exot.* 1928, June 13, Vol. 21, No. 6, pp. 453-485.]

In the year 1887 the native population of New Caledonia was approximately 42,000 and it diminished to 26,915 by the year 1928. During this period the rate of loss per cent. per annum has lessened for the figure stood at 1.75 in 1887 and has now fallen—apparently steadily—to 0.72. In other words the depopulation continues though it is less rapid than it was and it is much less rapid than it is in some other parts of Melanesia.

Dr Nicolas discusses some of the possible causes of loss of population. He thinks that in the period prior to about 1887 excessive and unwise consumption of alcohol was a cause of loss of life but that it is not so to any great extent at the present day. He does not believe that either syphilis or tuberculosis are important. In common with most authors who have studied Melanesia, he believes that abortion is commonly brought about by the use of certain vegetable poisons but it is not easy to see that this practice can account for the rather dramatic loss of population which has occurred in the last half-century particularly. He holds that the principal cause of loss of population is in-breeding and this he attributes in part to the institution of Christian marriage and Christian monogamy in part to Government regulations which prohibit, or tend to prohibit, the free movement of

natives from one part of the island to another and in part to the abolition of wars and raids, which in the old days were accompanied with much free mingling of natives of different villages and tribes.

[Dr Nicolas has been for twenty-one years a doctor in the native department of New Caledonia, and he has the problems and difficulties of the native race very much at heart. His opinions are, therefore to be received with respect and attention but in one or two ways his paper is open to criticism. It contains an insufficiency of hard fact, relating either to the loss of population or to the common diseases of the country. Moreover he does not distinguish between the diseases which are native to the country and those which have been introduced by the European comparatively recently but this distinction is vital, for it is clear that the depopulation is a recent phenomenon and in some way associated with the arrival of the European. There are two topics which he has failed to discuss. He makes no mention of the very important fact that in New Caledonia, as in so many parts of Melanesia, the sex ratio is quite abnormal, a very high proportion of males existing in the population as a whole. He fails also to speak of the remarkable contrast between the east side of New Caledonia, which is exposed to the trade winds and receives a constant and abundant rainfall, and the west side which is sheltered from wind and rain by a high range of mountains. This difference in climate is accompanied by a striking difference in vegetation and also one might assume in salubrity.]

P. A. HURTON.

- i. KRITSCHESKI (I.) & SCHAPIRO (S.) Ueber die Natur der Immunität bei Rückfallfieber. III. Die Antikörper als Schutzapparate des Organismus bei Rekurrenz. [The Nature of Immunity in Relapsing Fever. III. Antibodies as Protective Factors.]—*Ztschr f Immunitätsf u Experim Therap* 1928. June 4 Vol 56. No 3-4 pp 308-321 [Refs. in footnotes.]
- ii. ——— & SCHWARZMANN (L.) Die Bedeutung des retikulo-endothelialen Apparates bei Infektionskrankheiten. I. [Significance of the R.E. Apparatus in Infectious Diseases. —*Ibid* pp. 322-329 With 4 charts in text (12 refs.)
- iii. LISCHENOWA (A. W.) Ueber die Natur der Immunität beim Rückfallfieber. IV. Das Verhalten des retikulo-endothelialen Systems der Ratte bei der Mischinfektion mit Recurrenzspirochäten und *Bartonella muris*. [Behaviour of R.E. System of Rats in Mixed Infection with Recurrence Spirochaetes and *Bartonella muris*.]—*Ibid* Sept 24 Vol 58 No 1-2 pp 83-88. [1 ref.] [Microb. Research Inst. Education Commissariat R.S.F.S.R. Moscow.]

i. In the first of these new studies by Kritschewski and his collaborators the question is raised how far the protective functions exercised by the R-E system in recurrent infection depend on phagocytic action by the R-E cells or on antibody (lytic) action. Previous experiments had shown that splenectomy in conjunction with blockade caused over 90 per cent of white mice to succumb to *S. albanus* infection. The authors set out to determine (1) whether with an intact R-E system the destruction of spirochaetes and recovery from infection ran parallel with antibody-development and (2) whether in the event of such parallelism being demonstrated, the production of antibodies proceeded when the R-E system was cut out. Rats were

employed for these experiments. At various periods after infection the animals were bled and their sera tested for lysin-content by injection of mixtures of serum and mouse blood containing *S. duttoni* into several normal mice. Normal rat sera were tested similarly as controls. The results showed that only after the acme of the infection was passed did lysin begin to appear in the serum of animals with intact R.-E. system. As recovery progressed the lysin content increased to such extent that all mice inoculated with the mixtures of serum and infective mouse blood survived. Having decided that in normal rats destruction of spirochaetes and recovery coincided in time with maximal lysin development the authors now performed splenectomy experiments. Splenectomized rats were found to succumb regularly to infection with *S. duttoni* and it was noted that the serum of the animals taken during the agonal period contained no lysin. What then would be the effect of administering lysin-containing serum to such splenectomized rats? Would it lead to cure? If it did it would show that cure was essentially a function of lysin production and not of phagocytic action or intracellular destruction of spirochaetes. Experiments designed to test this point showed that if lysin-containing serum was given simultaneously with the infecting dose to splenectomized and blockaded animals or therapeutically during the course of infection it saved the animals which thus behaved as if the R.-E. system was intact. The conclusion was reached therefore that the protective function of the R.-E. system in *recurrens* infection depended not on phagocytosis of spirochaetes by the R.-E. cells but on the secretion of lytic anti bodies.

ii. The second communication deals with an investigation on very similar lines of experimental infections in mice due to *T. gambiense* *Schizotrypanum cruzi* and *S. morsus muris*.

In these infections there was little or no evidence that the R.-E. system played the part of a protective mechanism as in *recurrens* infection. Full tables of protocols accompany both papers.

iii. The third paper recounts a reinvestigation of the effect of splenectomy on rats infected with *recurrens* in view of recent work showing that splenectomy in rats has the effect of bringing to light a latent *Bartonella* infection if such be present in the strain of rat employed. To get over the difficulty that deaths in splenectomized animals might be to some extent a consequence of the anaemia following *Bartonella* infection they gave neosalvarsan to rats one week before the splenectomy. This apparently inhibited the activation of *Bartonella* by the splenectomy and in such protected animals *recurrens* infection took a regularly fatal course. Their previous thesis would therefore stand.

J. C. G. Ledingham.

1. LISGUNOVA (A. W.) Ueber noch unbekannte Funktion des retikulo-endothelialen Systems. IV. Die Beziehungen der Chemotherapie und der Chemoprophylaxis zum retikulo-endothelialen System der Ratten. [Relation of Chemotherapy to the R.E. System of Rats.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Aug. 8 Vol. 57 No. 3-4 pp. 292-300 [3 refs.]

- ii. KRITSCHIEWSKI (I. L.) Ueber noch unbekannte Funktion des retikulo-endothelialen Systems. V. Der Mechanismus der die Aktivität des chemotherapeutischen Effektes bestimmenden Funktion des retikulo-endothelialen Systems und ihre Unabhängigkeit von der Schutzfunktion. [Mechanism of the Function of the R.E. System which determines the Activity of the Chemotherapeutic Effect. Its Independence of the Protective Function.]—*Ibid* Vol. 59 No 1-2 pp. 118. [Refs. in footnotes.] [Microb. Research Inst. Education Commissariat R.S.F.S.R., Moscow]

i. The first of these papers contains an account of experiments designed to test the influence of splenectomy on the chemotherapeutic and prophylactic action of various drugs in trypanosome infected rats. The experiments really constitute an extension to rats of previous work of a similar kind carried out on mice (see previous reviews of work from the Moscow Laboratory). The findings support those made previously in mice. Splenectomized rats receiving germanin therapeutically at various periods after infection from 48 hrs. to 120 hrs. lived 2-5 days while the controls lived 14 days. In prophylactic experiments with neosalvarsan the splenectomized animals lived 16 days as against 29.8 days for the controls. They conclude therefore that the R. E. system possesses the special function of determining the efficacy of the therapeutic agent.

ii. In this paper Kritschewski presents two new series of experiments designed to test the truth of his theory that an intact R.-E. system is indispensable for the efficient working of a chemotherapeutic remedy. If the drug has to be absorbed by the R.-E. system in the first instance and possibly modified in the process then perhaps the incorporation of the drug in agar (8 per cent.) instead of in salt solution and the injection of the drug-agar mixture into the subcutaneous tissues or the muscles might compensate for the environment that is lost in the splenectomized animal. Tabulated experiments show indeed, that in the splenectomized animals the effect of the drug is much enhanced when administered in combination with agar. Apparently therefore, in the absence of a spleen the slow discharge of the drug from the drug-agar mixture plays a useful part. In a second series of experiments the drug was digested with the trypanosome-containing blood *in vitro* before injection into the splenectomized animal. The loss of the spleen in this case made no difference to the efficacy of the drug. Full protocols displaying the experimental data accompany the paper.

J. C. G. Ledingham

To IETTI (Francesco) La prova della tetracoloro fenoltaleina con speciale riguardo alle alterazioni dell'apparato reticolo endoteliale e alla malaria. [The Rosenthal Test with Special References to the Changes in the R. E. System and to Malaria.]—*Policlinico Sci. Med.* 1928 Oct 1 Vol 35 No 10 pp. 572-580 [161eb.] [Inst. of Clin. Med. Univ. Rome]

Tonietti discusses here the various pathological conditions in the course of which a positive Rosenthal test may be obtained. This injection test was originally designed to afford an index of the functional activity of the liver. Among the diseases investigated by Tonietti were eight cases of malaria all of which gave strongly positive Rosenthal

reactions and the author in view of the fact that in malaria the R.-E system is profoundly altered is inclined to regard the test as equally an index of the functional activity of this system. The particular product used for the test was the Tetrachlorofenoltaleina sodica or Merk's Clorotetragnost.

J. C. G. Ledingham

FELDT (Adolf) & EISENMENGER (Clara) Die Rolle des Reticuloendothels beim chemotherapeutischen Heilungsvergange. II Mitteilung. [The Role of the R.E. in Chemotherapeutic Curative Processes.]—*Ztschr f Hyg u Infektionskr* 1928 Dec. 15 Vol. 109 No 2 pp 410-426 [7 refs.] [Robert Koch Inst. Berlin.]

This paper deals with certain controversial points which have arisen in connexion with previous reports on this subject by the authors and by KRITSCHIEWSKI and JUNGBLUT (see previous reviews). KRITSCHIEWSKI and RUBINSTEIN and also JUNGBLUT had found that experimental recurrens infection of splenectomized mice had a disastrous effect on the course of the disease a very high mortality resulting. Feldt and Eisenmenger now claim to show though the evidence is not quite convincing that by employing satisfactory animals not subject to intercurrent infections and by improved methods of spleen removal it is possible to get a similar reaction to recurrens in splenectomized as in normal mice.

The remaining portion of the paper deals with experiments which in the authors opinion disprove the previous contention of KRITSCHIEWSKI and of JUNGBLUT as the result of their chemotherapeutic efforts in splenectomized animals that the R.-S is the tissue in which oxidation of salvarsan takes place and in which the oxide becomes the true parasitotropic substance. They find that however well based this theory may be so far as trypanosome infections of rats are concerned it does not hold for recurrens infection.

J. C. G. Ledingham.

DUGDALE (J. N.) "Burning Feet" and other Problems in Estate Medical Practice.—*Malayan Med Jl* 1928 June. Vol. 3 No 2 pp 74-76

The patients who complain of burning feet are mostly middle-aged ill nourished coolies who have been in the country months rather than years. There is no redness and rarely swelling but sometimes marked engorgement of the blood vessels wasting is generally seen. There is associated peripheral neuritis. Many coolies are repatriated each year. The cause or causes are obscure but food deficiency is a likely factor. Sir David GALLOWAY said he had been familiar with burning feet for forty years. He would call it a neuritis due to the combined effects of malaria and some vitamin deprivation.

[Burning of the feet in Indian sepoys was described by Assistant Surgeon MALCOLMSON of the Madras Medical Establishment in a book published in 1835 * It came to light in Madras sepoys employed in

MALCOLMSON (John Grant) (Assistant Surgeon Madras Medical Establishment) Observations on Some Forms of Rheumatism prevailing in India (pp. 32-63) 1835 Madras Printed by Order of Government Veterinary Mission Press

the Burmese War at Ava on the Irawaddy and in the Straits of Malacca not till they had been some time in the country where the climate is moist compared with Madras. It was most severe under conditions of fatigue and exposure and the subjects were liable to sloughing ulcers. The ration consisted of rice two ounces of ghee a little salt fish and spices. It was considered to be distinct from the "common rheumatism" of India and from beriberi.

Whether this is the same condition as that described in Malaya or not, it is to be hoped that Dr. Dugdale will put on record a detailed study of "burning feet."

A. G. B.

COORE (A. B. Jesser) "Burning Feet. (Correspondence).—*Malayan Med. J.* 1928. Sept. Vol. 3 No. 3 p. 129

The experience of the author who writes from Johore, is that "burning feet" is confined entirely to Tamil coolies and appears in periodic waves especially at times of economic stress. At the same time night blindness is observed, and there is evidence of scurvy—swollen gums emaciation harsh, dry scaly skin variation in pigmentation, cracks in lips. Antiscorbutic treatment is completely successful. Immediate relief to the pain is given by immersion for long periods in hot water or hot 1 in 20 carbolic lotion. He believes that scurvy in varying degree is more prevalent among Indian coolies than is generally recognized.

A. G. B.

CHOPRA (R. N.) DIXSHIT (B. B.) & DAVID (J. C.). *A Comparative Study of the Action of Cinchonidine and Cinchonine on the Heart.*—*Indian J. Med. Res.* 1928. July. Vol. 16. No. 1 pp. 125-133. With 24 figs on 7 plates [10 refs.] [Calcutta School of Trop. Med. & Hyg. Calcutta.]

(1) Intra-eneous injections of cinchonidine in animals produce a marked depression of the amplitude of auricular and ventricular contractions accompanied by a fall of blood pressure. The irritability of the myocardium is markedly decreased the latent period and the refractory period are both lengthened.

(2) Cinchonine produces an apparent stimulation of the auricle and a depression of the ventricle. The former effect is shown to be produced by depression of the inhibitory nervous mechanism and the latter by direct action on the heart muscle. The irritability of myocardium is decreased but not to the same extent as with cinchonidine. The latent period is not increased in frog's heart muscle and the refractory period is not appreciably affected.

(3) Both cinchonine and cinchonidine temporarily restore the normal rhythm of the heart after it is experimentally made irregular with acetylthiocholine. This is partly due to the depression of the vagal mechanism and partly to direct depression of the heart muscle.

(4) Our experiments show that the laevo-rotatory alkaloid cinchonidine has a more powerful depressant action on the heart muscle than the dextro-rotatory cinchonine.

C. L.

REVIEWS AND NOTICES.

MEXICO Departamento de Salubridad Publica. *Primer censo de la lepra.* [First Census of Leprosy]—503 pp With 31 maps 1 folding coloured map & 1 folding chart. 1927 Mexico

This imposing volume contains a mine of information on the subject of leprosy in Mexico. It is a first census and the scheme on which it has been carried out is such that future records will be very largely a mechanical process based on these foundations. Several hygienic questions have been considered by the Public Health authorities of Mexico of late such as the prevalence of *Anopheles* and malaria, statistics on tuberculosis and on cancer but it was found that on so important a disease as leprosy there was almost total ignorance. Information was asked for in the form of a questionnaire sent to every practitioner in each of the States relating to 1 232 municipalities, also to the various Governors local health bodies hospitals, asylums clinical laboratories, schools prisons and reformatories.

The results have been embodied in the present work, which is the outcome of the labours of Dr J GONZÁLEZ URUEÑA the Director of the Public Health Department.

Each State has a section to itself and in the section is given a list of the medical men, hospitals and other institutions, and municipalities to which the circular was sent. The replies [many unfortunately sent no reply and this naturally is the fly in the amber] in each case are gathered together in a tabular statement, giving the name of the municipality the total number of lepers in it the number of each form (nodular anaesthetic or mixed) the age and sex of the patients whether married, single, or widowed the place of birth, place of acquirement of the infection the age when symptoms first made their appearance whether contracted by contact, the character of the food generally before symptoms were first noticed, the nature of the lesions and lastly a column for observations which are very informative in most instances.

Several censuses of the population have been taken during the last 20 years but according to Dr Gonzalez the most reliable is that of 1910 when the total inhabitants numbered 15 160 369. The lepers found totalled 1 450 which on this basis would be about 1 to every 10 450. In the present investigation however the number of persons dealt with amounted to less than half the estimated total namely 6 956 657 which would raise the proportion to 1 in 4 797—clearly a more correct figure. No cases were found in the State of Tlaxcala, a small state of only 184 171 inhabitants Jalisco with a population of 1 208 855 of whom only 510 623 came into the present leper-census headed the list with 237 cases or 1 to 2,152 of the smaller census 1 in 5 100 of the entire population according to the former census.

Of the 1 450 cases 795 were males 456 females in the remaining 199 the sex was not stated. 734 were of the nodular form 262 nervous 253 mixed the remainder not known. As regards age 352 (24.3 per cent.) were in the third decade 214 (14.7 per cent.) in the fourth, 212 (21.5 per cent.) in the fifth 507 were single 428 married 116 widowed, the state of the remainder (399) in this respect being unknown.

As regards the mode of infection 359 traced them to direct contact, 197 denied any association, and 96 attributed it to heredity. No information was given in 788 cases. The question of diet was asked with a view to ascertaining once again whether fish-eating had any connexion with the disease. The answers lent no support to the theory. Of 880 cases 301 lived mostly on pork and rarely ate fish 24 only preferred the latter 501 partook of both.

The work terminates with tables of the collected figures and a map coloured to show the degree of prevalence of the disease in different parts of Mexico.

It was probably hopeless from the first to expect complete success in such a large undertaking but it seems a pity that so many medical men failed to

reply to the questions asked, that only 45.8 per cent. of the population (as estimated by the 1910 census) were investigated.

The defects of the record, however, can in no way be laid to the charge of the Director of the Public Health Department, whose energy enabled all this work to be done in the course of two and a half years. It is a pleasure to read a Spanish work so well got up and so well printed.

H. Harold Scott.

BOSE (J. P.) [M.B. (Cal.) F.C.S. (Lond.) Research Worker on Diabetes, Calcutta School of Tropical Medicine & Hygiene Physician, Carmichael Hospital for Tropical Diseases, Calcutta.] *A Handbook on Diabetes Mellitus and its Modern Treatment*—pp. xvi+192. With 8 charts & 1 coloured plate. 1928. Calcutta & Simla. Thacker Spink & Co. [5s.]

The author of this little book has been the holder of the Mitra Research Scholarship in Diabetes at the School of Tropical Medicine at Calcutta for six years and as he has also had considerable clinical experience of the disease he is well qualified to write about it. His object, he tells us, has been to produce a small handbook dealing with the salient features of diabetes as influenced by conditions of life in India. In this he has been thoroughly successful for in a short compass he gives an admirable account of modern views on the disease and describes fully its treatment. The diet tables drawn up to meet the habits of Indian patients, are particularly useful, and are not to be found in other books and the standard diets which are described in detail should be of great help to the practitioner. Altogether the book reflects credit on the author and on the Calcutta School and should be in the possession of every doctor who practises in India, a country in which diabetes is so common.

Robert Hutchison.

ZÜLLER (Margarete) *Die Spirochäten. (Nachtrag)* [The Spirochaetes (Supplement).]—*Handbuch der Pathogenen Protozoen* [von PROWAZEK (S.) the late, continued by ZÜLLER (W.)] Lieferung 11 pp. 1627-1793. With 78 text figs. & 2 coloured plates. 1925. Leipzig. Verlag von Johann Ambrosius Barth. [Rm. 12.]

The extremely rapid growth of the literature of this subject in recent years is strikingly shown by the present volume which is a supplement to GOODE's article on Spirochaetes in the second volume of this Handbook published in 1920. The more general use of the ultramicroscope is partly responsible for the discovery of large numbers of new forms, including many *Leptospira* and in addition much attention has been directed to spirochaetes as a result of their importance as disease agents being more generally appreciated. Whether our advances in knowledge are commensurate with the formidable output of publications may be left to the reader's judgment but the volume under consideration contains good summaries of the sections described and comprehensive lists of references to the literature.

The article begins with a general account of spirochaetes and the author's well-known views as to the essential unity of the structure of spirochaetes, from *Escherichia* & *Spirochaeta plicatilis* down to the smallest *Leptospira*, are fully developed. As a result, she adopts the view in common with MINNIE and many other authorities, that there is not sufficient justification for the subdivision of the group into different genera and consequently throughout this work, all forms are referred to the genus *Spirochaeta*.

The second part is divided into three sections: the free-living water spirochaetes, the saprophytic forms occurring in man and animals, and

finally parasitic forms which seem to be definitely pathogenic. Most of the account is concerned with publications which have already been reviewed in this *Bulletin*. The section dealing with saprophytic forms includes a useful table giving a list of all species recorded from animals together with the hosts and references to the original descriptions. The section on pathogenic spirochaetes begins with an account of Weil's disease for the causative organism of which the name *Spirochaeta icterogenes* is adopted. The discussion as to why this name is used instead of the usual *icterohaemorrhagiae* [which has priority] seems rather pointless as the author supports the view that all pathogenic *Leptospira* belong to one species and the only reason given for adopting the name *icterogenes* is a doubt as to the serological identity of the German and Japanese forms (p. 1697).

This is followed by descriptions of seven-day fever (*Spirochaeta hebdomadis*) and of the genital spirochaetosis of rabbits or rabbit syphilis (*Spirochaeta pallida* var. *cuniculi*). The article concludes with a section on rat bite fever which although caused by a *Spirillum* is included for convenience in the present volume.

The book is well printed and the illustrations for the most part are well chosen and excellently reproduced. Although the importance of work by German investigators is a little over-emphasized in the text the references given at the end of each section will help the student to obtain a fuller knowledge of the subject and the article can be thoroughly recommended as a useful addition to the literature of a very difficult group of organisms.

E. Hindle.

Sir Ronald Ross K.C.B. K.C.M.G. F.R.S. etc. Directeur du Ross Institute de Londres. Prix Nobel 1902. Une grande page de l'histoire de la médecine. La découverte de la transmission du paludisme par les moustiques. Préface et traduction de l'anglais par le Dr Charles BROQUET [Discovery of the Transmission of Malaria by Mosquitoes. Nobel Prize Essay 1902].—173 pp. With 9 plates & 7 text figs. 1929. Paris. Norbert Maloine Editeur. [20 francs.]

The Great Page of History in Medicine here alluded to is the page on which is written the story of the discovery of the transmission of malaria by the mosquito and the working out of the life cycle of the malaria plasmodia from man to mosquito and mosquito to man. It is a story that is or should be well known to all English medical men but it will bear repeating especially in other languages. This was the work of Sir Ronald Ross of the Indian Medical Service begun at the suggestion of Sir Patrick Manson and carried by Ross to a triumphant conclusion after years of work in 1898. For many years the mosquito had been suspected and one or two theories were put forward which will be found in this volume. Until LAVERAN discovered the plasmodium of malaria there was little to guide an investigator. MANSON had shown that a mosquito was the intermediate host of *Filaria nocturna* and he suggested to Ross that a mosquito was also the intermediate host of the malarial parasite. From this began Ross' work as set forth in detail, with plates and figures in the Nobel lecture delivered at Stockholm in December 1902. It is this lecture which Dr Broquet has translated. Sir Ronald Ross did not remain satisfied with his discovery alone; he has always insisted on the practical application of the knowledge obtained to the protection of the inhabitants and the prevention of malaria in the tropics. The Nobel lecture contains several instances of success. Ismailia, Havana, the Panama Canal Zone etc. In a long preface of 28 pages Dr Broquet gives a condensed biography of Sir Ronald Ross and reviews his work in some detail.

J. H. Tull Walsh.

SAVAS (Constantin) [Président de la Ligue] & CARDAMATIS (Jean P.) [Secrétaire de la Ligue]. *Ligue Antimalarienne Hellénique* (1905-1928) [The Antimalaria League of Greece.]—178 pp. 1929. Athens Imprimerie Française Le Progrès Rue du Stade 10.

This interesting document recounts the story of the Antimalaria League of Greece from its modest beginnings in 1905 to the present time. Starting in small proportions and in short measures but with infinite zeal, in the course of seven years it gathered strength and made its influence felt by spreading a vivid knowledge of the real nature of malaria among all classes of the people by providing special courses of instruction for doctors, by enlisting official help in the distribution of quinine by securing a modicum of essential financial aid from the State and by a few modest object lessons in the less costly of modern methods of controlling malaria both in country and in town. But then, alas, began (in 1912) that series of wars whereby Greece was submerged for ten years during which the growth of the League was stayed and its good work undone.

We learn from the authors that this Antimalaria League was a concept of their own, begotten of CERRI's Italian Antimalaria League—a concept that took corporate shape in a meeting of Athenian notables in the Academy of their city. Although it received royal patronage and other official benediction it seems to have subsisted for some years entirely on subscriptions and casual donations—sums of a thousand or two thousand drachmas (about £40 or £80 respectively)—sums which, when the magnitude of the enterprise in hand is considered remind one of the private soldier's gift against the deposed King Henry V in the play—of going about to turn the sun to ice by fanning in his face with a peacock's feather.

Something of the magnitude of the undertaking was prefigured in the emblem adopted by the League—Hercules smiting the Lernean Hydra. For the early investigations of the League disclosed the fact that in all Greece the area of which at that time was 60 000 square kilometres, the tracts occupied by marsh amounted to 83,000 hectares—that is to say an average of more than 8½ acres of marsh to every square mile of territory. At the same time the burden of malaria bore upon 30 per cent. of the population of the country; of its (then) 445 communes only 29 were exempt from it and in 6 of them its pressure in the individual communes was felt by numbers ranging between 50 and 100 per cent. of the inhabitants. These statistics were collected partly by the provincial doctors partly by a special commission and partly by the provincial mayors of whom some were themselves doctors or had doctors in council. In Crete, where of its 20 provinces 8 were free from marsh, and only 4 contained marshes of any considerable extent the mean incidence of malaria worked out at 18.9 per cent. (Such are the figures published in 1906 for "Old Greece." Later figures published in 1924 and 1925 include the extensive additions of territory known as "New Greece" and show for the "old" provinces a fall in the mean incidence of malaria to 26.82 per cent.)

To cope with this formidable task the League had its subscriptions and its precarious donations with in the fourth year of its existence an annual grant from the State of 5 000 drachmas (nom. £203 6s 6d.) With such limited resources treatment of marshes was out of the question, therefore the League had to concentrate on the methodical employment of quinine and on such minor ant mosquito operations as the clearing of obstructed rivulets, springs, pools etc.

In 1923 the annual Government grant was increased to 200 000 drachmas (nominal £8 125) and from that year also the Red Cross Society has contributed 10 000 drachmas annually besides some minor sums for specific objects. But along with this apparent improvement in the financial position there had come as a consequence of the country's last disastrous military ambitions a "tremendous influx of a million utterly destitute immigrants, of whom many were infected with malaria and many more were virgin soil

for infection and it is with that piling of Pelion upon Ossa that the harassed Olympians of the League are finally confronted. Naturally they would throw themselves entirely upon the State and among the suggestions here made for facilitating Government intervention is an appeal to the Rockefeller Foundation. In proposing such an appeal they cannot of course remind the world—though the world need not forget—that much of what makes life interesting and significant and beautiful to civilized men is a legacy from Ancient Greece and therefore it is to be hoped that there are wealthy men in the world—as there have been poets—with an imagination to appreciate this imperishable gift and a natural instinct for the soil from which it sprang.

We have still to notice though very briefly since most of it here is a retold tale some of the antimalaria operations carried out by the League. In the first place and during three seasons 1907-1909 the campaign in the ever memorable plain of Marathon, where the entire agricultural population—about 1680 souls—lay under the incubus of three species of malaria parasites and of three dangerous species of *Anopheles* mosquitoes. Here the entire population was treated systematically with quinine and the *Anopheles* larvae were destroyed chiefly by filling or by canalizing the pockets in the bed of their rocky torrents. (2) In Athens also where the morbidity rate from malarial fevers oscillated between 49.0 and 92.8 per cent and the principal nurseries for *Anopheles* were provided by the tortuous torrent Ilissus and its numerous affluents the same regulation of these tortuous torrent beds was effectively carried out as the sole measure. (3) In New Anchialos where the morbidity rate from malaria was 100 per cent. reliance was justifiably placed on methodical quinzionization. The measures adopted in the above three places showed that something could be done to restrict the incubus of malaria without attempting the reclamation of marshes.

With the resumption of its activities after the restoration of peace the League participated in measures for abatement of malaria in Thrace and Macedonia, where the unhappy refugees were settled and among whom malaria raged widely and with infernal fury and often too with tragic mortality and later in Epirus a notoriously marshy province where the morbidity rate from paludism ranged from district to district between 60 and 90 per cent.

In conclusion it is not superfluous to notice that the authors do not countenance the view that the fall of Greece from her ancient glory was due to introduction of the malaria parasites into the country from elsewhere. On the contrary they point among other things to the classical descriptions of paludal fevers and their physical associations in the Hippocratic writings as sufficient proof that the Ancient Greeks were always familiar with malaria from the earliest times. They are of opinion that it was in the latter stages of oppression and neglect that the people and country lay supine before the encroachments of malaria in short, that the spread of malaria was a consequence not a cause of her decline.

A. Alcock.

Manson's Tropical Diseases. A Manual of the Diseases of Warm Climates.—Edited by Philip H. MANSON B.A., D.S.O. M.A. M.D. D.T.M. & H. Cantab. F.R.C.P. Lond. Physician to the Hospital for Tropical Diseases London, etc. Ninth Edition, Revised.—pp. xx+921. With 23 colour plates, 12 half tone plates, 401 figures in the text, 6 maps & 34 charts. 1929. London Toronto Melbourne & Sydney Cassell & Co. Ltd. [31s. 6d.]

It seems hardly necessary to do more than greet the arrival of the ninth edition of *Manson* now in its 32nd year and no attempt will be made to deal with it in a critical spirit. The Editor's preface tells us that

attention has been specially directed to the subject of treatment and that in some subjects such as yellow fever it has been necessary to "remodel" previously conceived ideas in the light of recent investigations. Dr A. L. GAZZU has co-operated in a new section on the technique of blood transfusion. There are three new coloured plates and 5 half-tone plates as well as thirty new text figures. The total number of pages is about the same. Doubtless its vogue as a convenient and readable text-book will continue.

A. G. B.

DE LANGEN (C. D.) [Hoogleraar in de inwendige Geneeskunde aan de Geneeskundige Hoogeschool te Weltevreden] & LICHTENSTED (A.) [Officier van Gezondheid 1e klas N.I.L. destijds Leenaar aan de Militaire Cursus voor Tropische ziekten.] *Leerboek der Tropische Geneeskunde.* [Text Book of Tropical Diseases.]—pp. x+636+13. With 5 text figs. 26 plates & 16 figs. on 1 folding plate. 2nd Edition. 1923. Uitgave G. Kolff & Co. Weltevreden, Batavia, Leiden. [30s.]

The need for a second edition shows the popularity this book has attained in Holland and in the Dutch East Indies since its appearance a few years ago. It became in fact the most important text-book on tropical diseases in the Dutch language and as it mainly discusses the local conditions of the Malay Archipelago it is invaluable to medical students of the tropical schools in Holland, who intend to work in the Dutch East Indies and to students of the two medical schools in Java. Especially since the medical school in Weltevreden was raised to the standing of an academic faculty the existence of a modern, concise text book of diseases of the tropics in the Dutch language was very much appreciated. The book contains a great abundance of useful information about the conditions in the Malay Archipelago and it is a pity that owing to its language it remains inaccessible to most foreigners. A translation might perhaps be useful to medical men in the Malay States, where the conditions are similar to those in the Malay Islands.

The second edition shows several alterations and additions and room is found for a short discussion of tropical skin diseases.

H. Lwow

CONNOR (Frank Powell) [D.S.O. F.R.C.S. D.T.M. & H. Lt-Colonel I.M.S. Professor of Surgery Medical College of Bengal, Calcutta & Surgeon to the College Hospital, etc.]. *Surgery in the Tropics.*—pp. ix+293. With 99 illustrations. Churchill's Empire Series. 1929. London J. & A. Churchill, 40 Gloucester Place, Portman Square. [12s. 6d.]

In his preface the author remarks that some of the surgical procedures described in well known books on Tropical Medicine are considerably behind the times. He adds that with increasing rapidity of travel, the result of the extension of aërial transport in the near future the occurrence in temperate climates of diseases once thought to be essentially tropical, will become increasingly frequent and that a more thorough knowledge of tropical medicine and surgery for all medical students will shortly be necessary. For these and for many other reasons the appearance of Lieut.-Col. Sir F. P. Connor's work will be welcomed. It is the best book of its kind that has yet been published—well-written and well-illustrated, its contents admirably arranged and the author's views clearly expressed. An ordinary knowledge of surgery, surgical pathology and after-treatment on the part of the reader is taken for granted.

In dealing with the various special considerations which enter into a discussion of tropical surgery allusion is made to the influence of hot temperatures on the effects of general anaesthetics and the undoubted fact that chloroform is a much safer anaesthetic in India than in England by reason of the lesser density of the vapour produced more especially when the Junker apparatus is employed. The very necessary warning is given that slight lapses in technique may entail much graver consequences than in cooler climates owing to the greater profusion of bacterial life and the constant presence of the more dangerous anaerobes.

Under *staphylococcal* infections the author mentions the better understanding of glycosuric conditions which has followed upon the discovery of Insulin, often an invaluable aid in the treatment of carbuncle a dangerous distressing and exhausting condition in the tropics. Against *Streptococcal* infection tropical natives seem to possess some degree of natural immunity as compared with European residents either temporary or permanent. In *Plague* injections of Iodine both intravenous and local, are favoured this in the writer's experience being the only method of treatment by which a comatose plague patient has ever been saved until first used by him in such a case in 1911 the sole record of its previous employment by the intravenous method was for the treatment of anthrax in cattle. Under *Leprosy* the curious fact is noted that leprosy lesions can be dragged in the dust, or dressed with the filthiest rags for months or years without anaerobic infection.

Although *Tuberculosis* is one of the commonest diseases in the tropics its different surgical forms are rarer than would be expected and their superficial varieties seldom encountered. The author is of opinion that the radioactive properties of sunlight probably offer some explanation of this fact.

Mention is made of the enormous incidence of *Syphilis* in the tropics, and the aspects of the disease peculiar to hot countries briefly discussed. Gouddou and juxta-articular nodules are included among the tertiary manifestations of *Yaws* though difference of opinion as regards the first of these conditions is not overlooked.

Illustrative cases are given showing the close simulation by *Malaria* of many surgical conditions particularly in the abdominal and cerebral areas. In malarial subjects the liability to undue haemorrhage during and after operation must always be borne in mind.

Six chapters are devoted to the surgical aspects of the *Dysenteries*. The need for surgical intervention for the treatment of amoebic bowel lesions has become increasingly small since the introduction of treatment by emetine but the writer tells us that in very chronic cases he has seen dramatic improvement follow free coecal drainage. Appendicostomy valvular and open coecostomy as well as ileostomy associated with valvular coecostomy are considered and are recommended in particular types of cases the opinion being expressed that too early closing of the surgical opening is a common error as weeks must elapse after the amoebae have been killed off before the pathological processes due to secondary infection have cleared up. Amoebic abscess of the liver is dealt with at some length as might be expected and the fact is stressed that the whole aspect course and treatment of amoebic hepatitis and abscess have been so radically changed for the better by emetine treatment that only those who practised in the tropics before the introduction of this drug by Sir Leonard Rogers, can realize its revolutionary effect. Aspiration is regarded as the best line of treatment in the majority of cases but the open operation is recommended under certain definite specified conditions, and the reader is warned that when abscess has formed, those who rely on emetine alone to the exclusion of surgery will sooner or later meet with disaster.

The surgical complications of bacillary dysentery of less importance than those of the amoebic variety include rectal stricture for which if persistent, the only effectual treatment is considered to be a temporary colostomy maintained for three to six months thus giving the bowel complete rest.

Another complication which, when of a severe type may tax the surgeon's skill to prevent deformity or faulty ankylosis is arthritis.

In some general remarks on *Fulmaria* the fact is deplored that of recent years, no real advance has been made in research work on filarial disease, and that its pathology is still obscure. In spite of the millions of human beings infected, the multiplicity of surgical lesions for which the filaria is responsible and the untold misery thereby produced, enthusiastic workers and liberal funds are not forthcoming as in the case of leprosy. The writer believes, however that in the near future some specific remedy acting like tartar emetic in *Bilharzia* infections will be discovered. The streptococcus is throughout regarded as the villain of the piece. Funiculitis, a serious and dangerous condition with an undoubted connexion with filarial infection, receives special consideration. In Elephantiasis of the lower extremity experience shows that Mondoleon's operation gives definite relief. As operations for the removal of the elephantoid scrotum a satisfactory method of providing a whole-skin covering for the penis is still to be discovered.

Under *Guinea-worm* attention is drawn to the hitherto insufficiently recognised pathological significance of the remains of calcified worms in the tissues.

An appendix gives some interesting maps and tables showing the geographical distribution of some of the diseases of India.

This book is of convenient size, well printed on good paper with an entire absence of printer's errors. It should be in the hands of all practitioners in the tropics and will repay study on the part of the surgeon everywhere.

J. J. Pratt.

BAYLIS (H. A.) [M.A. D.Sc. Assistant Keeper Department of Zoology British Museum (Natural History)] *A Manual of Helminthology Medical and Veterinary*—pp xi+303. With 200 text figs. 1929. London. Baillière Tindall & Cox, 7 & 8, Henrietta Street, Covent Garden. [30s.]

This volume represents an attempt to bring together under one cover some account of the numerous species of worms parasitic in man and the domestic animals. As the author points out in his introduction, to deal exhaustively with even this small part of helminthology would require a work of encyclopædic dimensions. No attempt has been made to do anything of this nature. On the contrary the author has endeavoured to be as brief and concise as possible and to provide such short descriptions of the genera and species as it is hoped will suffice with the aid of illustrations, to enable the reader to determine at least approximately most of the parasites he is likely to encounter.

It is true that there are in existence a number of books which contain an account of the helminth parasites of man, and which, to a certain extent, meet the needs of the medical student but the veterinary student, to whom the subject is of perhaps even greater importance, has to fall back upon works which not only are hopelessly out of date, but are in almost all other respects quite unsuitable for his needs and those who are called upon to teach helminthology have long been impressed with the urgent need for a text-book adapted to the requirements of the medical and veterinary student.

Although in the view of one who has for many years been engaged in teaching parasitology the present volume is for this purpose not entirely adequate it is undoubtedly a great advance on anything of the kind yet produced and both the author and the student are to be congratulated on its appearance.

The author has managed to condense a great mass of information into a volume of very modest dimensions—it is unfortunate that it is not found possible to produce books like this at an equally modest price. An account is given of the Trematode, Cestode and Nematode parasites of man, dog,

cat pig cattle sheep goat camel horse (including donkey and mule) fowl turkey guineafowl duck goose and pigeon. At the end of the volume there is a list of the parasites found in each of these animals.

The general arrangement of the material is based on the zoological classification of the parasites and the names used are those believed to be most in accordance with a reasonable interpretation of the rules of the International Commission on Zoological Nomenclature.

To anyone who studies the book, it is at once obvious that it is written primarily from the standpoint of the zoologist. The descriptions of the morphology of the various species are excellent. Little reference however is made to the pathology of the subject and in many cases the life history of the parasite is dealt with in the briefest possible manner. The question of clinical methods of diagnosis—so important to the medical and veterinary practitioners—does not receive sufficient attention. For example some fifty pages of the book are devoted to the *Strongyle* parasites and not a single *Strongyle* egg is figured. Such omissions which are doubtless the result of a resolute determination to limit the size of the work unfortunately of necessity lessen its usefulness to the medical and veterinary student.

The work in the reviewer's opinion cannot correctly be described as an introduction to the subject such as could confidently be pressed upon all medical and veterinary students who are entering upon a course of study of helminthology. On the one hand certain fundamental aspects of the subject, such as technique and methods of preparation of the different types of worm for examination and study are completely ignored. Moreover it is very doubtful whether without careful supervision and help the ordinary student could comprehend the introductory matter to each of the sections. This matter would have been greatly simplified by clearly labelled diagrams illustrating the various structures described. On the other hand in an endeavour to ensure completeness of the work from the zoological point of view descriptions have been given of large numbers of parasites of merely academic interest to the medical and veterinary student, thus rather tending to over burden the volume from the text book point of view.

The various parasites are clearly illustrated by drawings which are at once understood by the expert but here again the reviewer is compelled to express some doubt whether the absence of explanatory lettering from many of the figures will not render them unintelligible to the ordinary student. There is however no doubt that the book is a most valuable production and will prove of the greatest service not only to the senior student, but as a work of reference to the teacher and to all those specially concerned with human or veterinary helminthology.

Warrington, Yorks.

UVAROV (B. P.) [Senior Assistant Imperial Bureau of Entomology] *Insect Nutrition and Metabolism. A Summary of the Literature.* Prefatory Note by Captain A. F. HENNING C.B.E. Assistant Secretary Committee of Civil Research.—Reprinted from *Trans Entomological Soc. London* 1928. Dec. 31 pp. 255-343

Since the bodies of disease-carrying insects constitute the milieu of many organisms pathogenic to man the study of the chemistry of this environment or in other words of the physiology and biochemistry of insects would seem an obvious line of attack upon the etiology of the diseases in question and it is surprising that it is only during the last few years that the lack of fundamental knowledge of insect physiology has begun to be felt. The same is true throughout the whole of economic entomology and it was the realization of this want that prompted the Sub-Committee on Dietetics of the Committee of Civil Research to entrust to Mr B. P. Uvarov the task of collating all the work which has been published upon the nutrition and metabolism of insects. The result is represented by the paper under review.

which consists of a sixty-five page summary of the literature followed by a bibliography containing nearly six hundred titles. A very just assessment of his paper is given by the author in his introduction where he disarms criticism by pointing out that, being neither a physiologist nor a chemist, his method has throughout been merely summary and not critical. The result is that a perusal of many of the sections gives a highly erroneous impression as to the relative value of the various papers discussed. But, as the author rightly points out, the most valuable section is the bibliography and the paper is to be regarded merely as a guide to this. Used in this way the publication is a very valuable one indeed for this is the first time that the scattered literature on the subject has been collected, and it will constitute an essential starting point for every worker on this aspect of insect physiology.

The terms nutrition and metabolism are broadly interpreted and besides including work on diet and digestive enzymes there are sections which deal with all the published data on the chemical composition of insects and their products (silk, pigments, cantharidin, etc.) the scanty literature on intermediary metabolism and excretion and the broader questions of the influence of diet on growth and reproduction. The author is undoubtedly right in excluding purely morphological and histological work, for this is readily obtainable from text books, but the worker on the subject will be ill advised to follow this example for the study of function uncontrolled by histology is prone to be as fallacious as the converse is to be unfruitful.

Essentially medical insects figure conspicuously little in this work but this is not the fault of the author nor does it detract from its value to the medical zoologist who whether he be seeking the optimal conditions for the artificial culture of parasitic micro-organisms or the factors which determine the specificity of the insect host, will find here whatever limited data are available upon which to base his work. The avowed intent of the paper is to provoke research and certainly nothing could be more provocative than the numerous and important gaps in knowledge which it displays.

V. B. Wigglesworth.

BRUNET (E.) [Professeur de Parasitologie à la Faculté de Médecine de Paris. Membre de l'Académie de Médecine] & NEVEU-LEMAIRE (M.) [Professeur agrégé Chef des travaux de Parasitologie à la Faculté de Médecine de Paris.] *Travaux Pratiques de Parasitologie*.—pp vi+301 With 202 figs. 1929 Masson et Cie, Editeurs Libraires de l'Académie de Médecine, 120 Boulevard Saint-Germain, Paris, VIe. [30 francs.]

This little volume does not profess to survey the whole field of parasitology in relation to disease, although it is a good deal more than a mere introduction to that field, since it includes the parasites of common occurrence and of settled importance in human pathology—just "the parasites that it is most useful to know"—together with their respective intermediary hosts in the natural environment. It is a guide-book to a course of laboratory-instruction in parasitology and is something more since besides showing how the parasites of man are to be sought and prepared for study and identification in the laboratory in their pathological aspects, it also imparts the essential facts of the individual life-history in the outside world. To insects 58 pages are given to ticks and mites 15 to round worms 28 to trematodes 23 to cestodes 28, to protozoa 43 to the coprological study of eggs of helminths and of intestinal protozoa and their cysts 18, and to the study of blood and its inclusions 10 to fungi 29 and to intermediate hosts 18. Of the 58 pages given to insects 40 are taken up by the flies, the only forms admitted being *Anopheles*, *Culex*, *Stegomyia*, *Phlebotomus*, *Sanninum*, *Stomoxys*, *Glossina*, and the various Muscid and Oestrid maggots responsible for myiasis in man. A rather surprising omission is *Culicoides*,

since the midges of that troublesome genus swarm at certain seasons in all parts of the world and inflict a virulent bite and one species in West Africa has been put upon the list as the intermediary hostess of a parasite (*Filaria perstans*) common enough there. The author's system of study is with each successive class or order or other natural group of parasites to consider the general provenance and methods of collection the means and manner of preparation for study and the general morphology and then in the case of each particular parasite to consider further the morphological detail the biology and reproduction and the pathological facts and phenomena. As already indicated faeces and blood and the facts and fancies that they present to the trained eye and to the untrained imagination form separate studies. The text is uniformly concise and the descriptive matter is liberally supplemented by excellent figures only a few of which—among the cestodes chiefly—are the old familiar clichés. As a handbook for the novice the little volume is a model of simplicity and conciseness and but for its definition of a parasite as a living being that for a part or the whole of its existence lives at the expense of other organized beings—a definition that includes the whole animal kingdom—it would also be a model of precision.

A. Alcock.

THOMSON (John Gordon) [M.A. M.B. Ch. B. Director Department of Protozoology London School of Hygiene and Tropical Medicine] & ROBERTSON (Andrew) [M.B. Ch.B. Lecturer and Milner Research Fellow Department of Protozoology London School of Hygiene and Tropical Medicine] *Protozoology A Manual for Medical Men.*—pp. xiii+376. With 220 figs. & 4 coloured plates. 1929 London Baillière Tindall & Cox 7 & 8 Henrietta Street Covent Garden. [30s.]

In this volume the authors have attempted to give a short succinct, but clear account of the morphology and mode of life of the protozoal parasites which are important as the cause of disease in man and at the same time to describe briefly their life histories on a knowledge of which intelligent preventive measures can be based. As a clear conception of the parasitic nature of an organism cannot be obtained without reference to the tissue and other reactions of the host, an account is given of the pathology of the lesions caused in man by the various organisms.

In the reviewer's opinion the authors are to be congratulated on having achieved what they set out to do. The book is admirably adapted for the use of students engaged in a course of study of protozoology at one of the schools of Tropical Medicine. It is well written beautifully illustrated, and contains just what it is necessary for the student to know.

Classification, with its multiplicity of long and difficult names is reduced to a minimum but the fundamental skeleton, which is so essential for an intelligent grasp of the subject, is not only presented in a form readily understood but since it is based on WENYON's well known treatise has the great value of scientific accuracy.

In addition to an adequate description of the protozoal and spirochaetal parasites of importance to medical and veterinary students an account is given of certain intracellular and other bodies the exact nature of which has yet to be determined, e.g. *Anaplasma Bartonella Rickettsia*. Sections useful to students have also been introduced on such subjects as Fallacies and Puzzles in Blood Examination and Common Objects in Faeces.

At the end of the book there is a valuable chapter on technique and also a glossary giving the derivations of a considerable number of terms and names commonly used in Protozoology.

Many years of experience in teaching Protozoology to medical and veterinary students have convinced the reviewer of the urgent necessity for

a really suitable text book. He is satisfied that the present volume meets this need. It is written in a manner that can be understood by the ordinary student and is of such moderate size that it can easily be read by a student taking the tropical medicine course at one of the schools. In short, it is the sort of book that one would expect from men who are experienced teachers.

It seems a pity that it has not been found possible to produce the book at a more modest price. In the reviewer's judgment, many of the photomicrographs might with advantage have been omitted, a considerable number of them are, in his opinion, of comparatively little educational value and their omission would have served the two-fold purpose of lessening the size of the book and reducing its cost.

W. Yorke.

BUXTON (Patrick A.) [M.R.C.S. D.T.M. & H. Formerly Milner Research Fellow Director Department of Medical Entomology London School of Hygiene & Tropical Medicine] *Researches in Polynesia and Melanesia. An Account of Investigations in Samoa, Tonga, the Ellice Group, and the New Hebrides, in 1924, 1925. Parts V VII (Relating to Human Diseases and Welfare) No 2 of the Memoir Series of the London School of Hygiene and Tropical Medicine*—pp. xi + 139 With 7 text figs. & 27 plates. 1928. November London School of Hygiene & Tropical Medicine. [9s.]

This memoir constitutes Parts V VI and VII of "Researches in Polynesia and Melanesia." Parts I-IV were devoted mainly to medical entomology. Part V of the present memoir treats of "Filariasis," Part VI of "Other diseases" and Part VII of "Brown man and white in Samoa." The first thirty nine pages of the section Filariasis are devoted to considering the relationship between microfilaria infection and filarial disease. They demand close attention, especially on the part of those in whom statistics however clearly expounded, produce inhibition of the reasoning faculty. The results that emerge from the investigation present interesting matter for reflection and problems for solution.

In regard to technique it is stated that the blood was taken from the lobe of the ear. Further it is recorded that the number of microfilariae in the blood varies from day to day from hour to hour and even from moment to moment. Whether these two facts are in any way connected we cannot say but in haematology the lobe of the ear should be avoided as a source of blood drops. A drop of blood from the ear may frequently give the appearance of leukaemia with a large mononuclear count of say 75 per cent., an appearance very different from that of the nth drop which will probably be normal. In examining for malaria, parasites in the first drop from the ear are at least twice as numerous as those in the second drop, the latter being frequently negative when the former is positive. It is important then to eliminate such a possibility of error as this, and it would seem advisable to conduct further researches on these variations, their extent and the time of their occurrence, and to make control observations on arterial and venous bloods.

Some of the peculiarities of microfilaria infection may be noted—

- (1) Microfilaria is not found in the blood (except rarely) in early childhood (0-5 years) in Oceania.
- (2) From 11 years onwards there is no consistent rise in the microfilaria count.
- (3) The incidence in females is lower than in males.
- (4) In Melanesia the microfilaria is periodic, in Polynesia non-periodic.

Turning now to the signs of filariasis we should bear in mind the author's statement that no one has found any satisfactory measure of the

incidence of filarial infection and filariasis in a community The author finds that —

(1) The percentage incidence of the physical sign is higher in the men with microfilaria in the blood than in those without it

(2) The percentage difference is higher for the epitrochlear glands than for the other signs selected (*viz* enlarged superior and inferior inguinal glands epididymis testis hydrocele) but we have the additional curious fact that

(3) There is no correlation between the number of microfilaria in the circulation and the enlargement of the epitrochlear glands

Enlarged epitrochlear gland the author considers to be one of the most important signs of filarial infection

In regard to elephantiasis the following data concerning the relationship of the disease to microfilaria infection appears to emerge from the tables

(1) Elephantiasis is commoner in those with enlarged epitrochlear glands than in those without

(2) Enlarged epitrochlear glands are commoner in those with microfilaria in the blood

The tables do not appear to show whether elephantiasis is commoner in those with microfilaria than in those without but on the other hand

(3) In groups with a high microfilaria rate the elephantiasis rate is higher than in those with a low rate

Again the microfilaria rates for Samoa the Atolls and New Hebrides are respectively 38 32 and 31 per cent and the corresponding elephantiasis rates are 5.6 8.0 and 6.0 Although the author gives a fairly complete table of his data (table 23) yet it is only a summary one and certain data cannot be extracted from it We think that all filaria investigators should publish complete protocols for the author himself points out in several places that he has not been unable to use other investigators' results as they have been presented summarily in such and such a way

However in regard to elephantiasis we have presumed to manipulate the figures available and have constructed the following table —

Age	Population.	Microfilaria cases.	Elephantiasis cases	Microfilaria rate	Elephantiasis rate
0-20	470	106	0	22.5	0
21-25	110	44	2	40	1.8
26-35	208	103	10	49	4.8
36-45	187	84	24	45	12.8
46 up	128	61	28	47	20.0
	1 113		62		5.6

This result is perhaps not inconsistent with that under heading (3) above but at any rate it appears to show that while the microfilaria rate remains constant the elephantiasis rate approximately doubles itself in each decade

Myositis (muscle abscess as distinct from gland abscess) occasions much chronic ill health in Samoa The author after a critical consideration of the facts collected by him, decides against any connexion with filariasis We have already indicated the author's views based on a close examination of the data that enlarged epitrochlear glands are one of the best signs of filarial infection. In leaving this subject we can only re-echo the view expressed by the author on the first page of the memoir *viz.*, that the pathology of filariasis is one of the most complex and least understood of the problems of tropical medicine but congratulate him on having brought forward fresh and definite evidence that infection with *Filaria* is an essential precursor to the development of tropical elephantiasis Those whose thirst for knowledge on these subjects has been temporarily assuaged by a study of Part V may be recommended to turn to Part VII

where they will find much of interest, a welcome relief after the rigours of Part V.

In a word the author has done an excellent piece of work. The memoir is illustrated by exceptionally good plates but one wishes it had been possible to avoid "glazed" paper for the printed page.

J. W. W. Stephens.

CALCUTTA. Annual Report of the Calcutta School of Tropical Medicine, Institute of Hygiene and the Carmichael Hospital for Tropical Diseases. 1928 [ACTON (H. W.) Director]—103 pp. With 3 plates & 1 chart. 1929 Calcutta Bengal Govt. Press. *P. 15*

Since the report for 1927 was reviewed—this *Bulletin*, Vol. 25 p. 755—there have been slight changes in the staff. Lt. Col. H. W. ACTON has succeeded Colonel MEGAW (now officiating Surgeon-General of Madras) and Dr. R. T. M. HAYTER becomes Assistant Director in place of Major BAPTIST who has retired. A great loss to the school was suffered by the death of Sir David LITTLE always a great friend, helping not only with his own money but by persuading other influential persons to help when help was most needed. Lack of funds still makes it necessary for some of the staff to teach more than one subject, e.g. the Director is Professor of Bacteriology, Pathology and Helminthology. Finance will be further reduced when the Research Institute at Dehra Dun is established since Rs 82,000 now received from the Indian Research Fund Association will be mostly given to the new Institute. The School is for research and post-graduate teaching only and patients are only admitted to the attached Hospital if considered suitable by the School staff. There are plenty of hospitals in Calcutta for emergency and other cases. There is a large Out Patient Department. We cannot enter fully into the various reports sent in by the teachers. This report is marked "For official use only" but much of the important work recorded has been published either in book form or in certain medical journals the *Indian Medical Gazette* and the *Indian Journal of Medical Research*. There is a long list of such books and papers at the end of the Report. An interesting piece of work in which the professors of Pharmacology and Chemistry have collaborated concerns the alkaloids of "hurchi" *Holarrhena antisyriaca*. They have proved useful in amoebic dysentery. These alkaloids are well tolerated intra muscularly and do not depress the heart or cause nausea and the cost of production is less than one-tenth that of emetine. Next to the reports by Professors come reports from the various research departments. These were enumerated in the review of the 1927 report. The report contains in a separate chapter statistics of the number of patients who attended the Pasteur Institute 1924-1928, for anti-rabies treatment. Among the list of animals recorded as canis bites we find Cow (4) Man (9).

J. H. Tull Walsh.

BUREAU OF HYGIENE AND TROPICAL DISEASES

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UNDULANT FEVERS

GILBERT (Ruth) & COLEMAN (Marion B) Recent Cases of Undulant Fever in New York State — *Jl Infect Dis* 1928. Oct. Vol. 43 No 4 pp 273-279 [6 refs.] [New York State Dept. of Health Albany]

Two hundred and thirteen samples of blood serum were examined and sixteen were found to agglutinate *Br abortus* in dilution of 1/40 or higher. Eight other similar cases were observed in a branch laboratory and two cases of laboratory infection were met with one due to *abortus* infection (wound of finger by broken pipette) and one to *melitensis* infection (sucked material into mouth from pipette). These 26 cases were carefully followed up and clinical histories are given. In none was there any history of contact with goats or pigs. raw cows milk was used in 14 cases and *Br abortus* was isolated from the milk supply also the sera of the cows agglutinated the same organism.

The clinical history of the two laboratory-infected cases was interesting the *abortus* infection was extremely mild and would have been missed had it not occurred in a laboratory worker who was known to have run an infected glass pipette into his finger the case of laboratory infection by *melitensis* was on the other hand, extremely severe.

The authors are of opinion that cases of undulant fever have been missed hitherto and give three reasons which they consider account for this (1) Severe cases have in the past been called typhoid fever tubercule etc. (2) Mild cases have been overlooked or called influenza. (3) In some quite definite cases the serum of the patient does not agglutinate either *abortus* or *melitensis*.

D Harvey

HARDY (A. V) The Epidemiology of Undulant (Malta) Fever in Iowa. (Preliminary Report.)—*Public Health Rep* 1928. Sept. 21 Vol. 43 No 38. pp 2459-2469 With 1 text fig [3 refs.]

In a previous paper it was shown that through the routine agglutination test with *Br melitensis* var *abortus* of all sera sent to the Health Laboratories a number of cases of undulant fever were diagnosed. The present paper deals with the epidemiological side

of the question. Consideration is first given to the accuracy of diagnosis and it is pointed out that all the cases were diagnosed clinically bacteriologically and serologically.

As regards the clinical diagnosis, one symptom which was constant for all cases was weakness. The temperature was irregular and intermittent and only in less than one-third could it be described as truly undulant. Yet other diseases could be excluded and the diagnosis may be considered as accurate.

As regards the serological diagnosis no case was included which gave an agglutination titre less than 1/80 for *Br. melitensis* var. *abortus* and in nine cases a titre up to 1/5 000 dilution was obtained. Blood culture was successful in nine cases.

Of the 83 diagnosed cases an epidemiological enquiry was made in 78. All but three occurred in one year—July 1927 to June, 1928—and 30 of them were reported in April, May and June. They occurred sporadically and were widely scattered throughout the State. The distribution is shown in a spot-map. Forty-six of the patients lived on farms and 28 in the larger or smaller towns.

Occupation.—Thirty-nine were farmers, six were pork packers, ten were housewives not on farms, and the remainder were variously employed.

Sex.—Sixty-three males and 20 females. Most of the cases were in the age group 20 to 49.

Source of Infection.—There is no evidence that infection was acquired from goats, sheep or horses. Very few goats are kept in the State and in only two cases was there even remote contact with goats. Infection from that source could be excluded. In 52 cases the evidence indicated that infection was acquired from cattle. Illustrative cases are given showing that in most infection was due to consumption of raw milk from cows which had aborted. In a few infection was due to actual contact with such animals. In another group of 11 cases, infection was probably acquired from hogs. There was evidence of repeated contact with infected hogs or pork and in these consumption of raw cows' milk was limited. The packing-house workers, six of whom developed fever, all used pasteurized milk. In one case the evidence strongly suggests that a wife who nursed her husband for two months during his illness, contracted the infection from him as they lived in a large city and had no contact whatever with animals and drank pasteurized milk. The husband had contracted the disease while on a journey.

Mode of Transfer of infective material from animals to man.—In 25 cases in which there had been no contact with animals the evidence suggests that infection had been conveyed by raw milk or cream. In the case of the packing-house workers, infection probably resulted through direct infection of cuts on the fingers or hand when dealing with carcasses of hogs. From a study of statistical evidence it is clear that those exposed to actual contact with infected animals are more liable to acquire infection than those who only drink the milk of such animals. In such cases, i.e. farm hands or veterinary surgeons who attend sick cattle and in pork packers, undulant fever must be classed as an occupational disease and the question of compensation has to be considered.

DUNCAN (J T) The Identification of *Brucella abortus* from Human Sources.—*Trans Roy Soc. Trop Med & Hyg* 1928. Nov 25 Vol. 22. No 3 pp 269-280 With 4 figs. on 1 plate. [46 refs.] [London School of Hyg & Trop. Med. London.]

This paper is a review of the literature concerning *Br abortus* infections in man with some original observations. [The writer as well as POPPE (see below) fails to mention the observations by KENNEDY in 1914 in the *R.A.M.C. Journal* that the milk and blood serum of London cows agglutinated *M. melitensis* in high dilution.]

The work of EVANS is discussed and it is pointed out that although the absorption test is a help in differentiating between *melitensis* and *abortus* it is inadvisable that it should form the sole test employed.

On the question of morphology it is noted that BRUCE originally called the organism discovered by him a coccus whereas BANG called his a bacillus and this might be 3μ in length. This differentiation still holds good in part. Duncan has found that if *Br abortus* is planted out on some rich medium such as Fildes medium bacillary forms are obtained whereas *melitensis* retains its coccid form on reverting to ordinary agar *abortus* reverts to coccid form this process is well illustrated in the paper by microphotographs.

Another difference that has been noted is that some strains especially bovine strains of *Br abortus* isolated in America and in Europe require a high concentration of CO_2 for initial growth whereas *melitensis* and *abortus* strains of porcine origin and the Rhodesian bovine strains are capable of growth without the addition of CO_2 .

The author has also found as did HUDDLESON that recently isolated strains of *Br abortus* can be distinguished from *melitensis* by their power of liberating hydrogen sulphide when grown in capped tubes and on rich media containing organic sulphur.

The author considers that agglutination and absorption tests alone are not sufficient to distinguish between *abortus* and *melitensis* nor can different strains of *abortus* be distinguished by this means.

The difference in pathogenicity for guineapigs may also be used to differentiate between porcine and bovine *abortus* (Theobald SMITH).

The author then discusses the various recent reports of infection of man with *abortus* and remarks that in many instances the particular organism was either not isolated at all or that when isolated it appeared to grow freely in ordinary culture and was only identified by absorption agglutination tests.

The recent Italian cases are discussed and it is pointed out that although the majority of these were due to infection from a cow with contagious abortion the Italians favour the view that this may be due to a *melitensis* strain.

In Rhodesia, goats as a source of infection may be entirely excluded, also hogs and thus leaves only contagious abortion in cattle which is common in that country.

Duncan has investigated a strain sent from Rhodesia isolated from a case of undulant fever in man and found that it resembled *abortus* in its agglutination reactions and in its ability to produce hydrogen sulphide and when cultivated for 24 hours on peptic digest blood agar it developed the long bacillary forms characteristic of *abortus* strains and when cultivated on glucose agar it reverted to the coccid shape. The strain was, therefore identified as *Br abortus*.

The fact that Rhodesian *abortus* strains when freshly isolated are free growing i.e. do not require additional CO_2 , differentiates

them from the European and American strains and would suggest that as BEVAN has said, the *Br abortus* of Rhodesia is a native variety.

The author concludes that the recent discovery in so many different countries of cases of undulant fever which in the majority of cases, can be traced to infection from milk cows, raises questions of great economic importance and renders very necessary a more complete study of the organisms isolated from man in the new areas of the disease.

D. H.

PORRE (K.) Die Bang Infektion des Menschen. (Abortus Infection in Man.)—*Deut. Tierärztl. Woch.* 1928. Nov. 24. Vol. 36. No. 47 pp. 781-786. With 2 charts. [75 refs.]

This paper consists of a very thorough and complete survey of the literature concerning the infection of man by *Br abortus* both historical and comparative. (It is interesting in this connexion that so few of these reviews mention the observation by KENNEDY of agglutins for *M. melitensis* in the milk and serum of cows in England in 1913-14.)

The author also gives two interesting tables which show the agglutination reactions of seven cases of *abortus* infection investigated by him in the University Clinic in Rostock. Four hundred and fifty four sera were examined and of these seven were found to agglutinate *Br abortus* in dilution between 1/200 and 1/6400. In one case also, blood culture was positive. Agglutination for typhoid was not present and the cases were clinically typical. The infection was, as elsewhere traced to consumption of raw milk in all but one and this patient had been employed in the care of a cow with contagious abortion.

The second table gives a comparison between the agglutination reactions of the patients and the agglutinations of the serum of the suspected cows all of which were positive and closely parallel to the results of the human sera. Three strains of *Brucella* were used, one *melitensis* and two *abortus* one of human origin and one bovine. No difference was noted in the titres of agglutination.

The remainder of the paper deals with the literature concerning the clinical aspect of the disease in man, with its treatment and its prophylaxis. In this last connexion pasteurization of milk and personal prophylaxis of veterinary workers and farm hands is recommended.

D. H.

VAN DER HORSTEN (J.) Het besmettelijk verwerpen der runderen in verband met ziekten van den mensch. [Contagious Abortion of Cattle and Human Disease.]—*Tijdschr. v. Diergeneesk.* 1928. Nov. 1. Vol. 55. No. 21 pp. 1065-1079. [31 refs.] English summary pp. 1079-1080.

The author asks the question on what grounds can we say that *Br abortus* (Bang) is pathogenic for man? He considers that the experiments of NICOLLE and BURDET lack force in that they were carried out with old laboratory cultures. [In a later research NICOLLE

and BURNET repeated their experiments and inoculated volunteers with fresh cultures of *abortus* without producing any infection.] It is obvious in view of the many sources of infection in herds of cattle and the few cases reported in man that *abortus* is but slightly pathogenic for man and BASTAI's suggestion, that infections derived from aborting cows may be due to *melitensis* is ruled out in such countries as Holland where Malta fever i.e. *melitensis* fever in man has never been recorded.

In the Central Laboratory in Holland 17 cases of *abortus* infection in man have been discovered since December 1927 in one case the bacillus was isolated from the blood and on inoculation into a healthy heifer produced abortion although the calf was born alive. The serum of the calf at birth gave a negative agglutination reaction whereas the serum of the cow reacted up to a dilution of 1/25 000 with *Br abortus* later on the serum of the calf also reacted. Seven of the 17 cases were infected by drinking raw milk and five by direct infection from aborting cows.

The author considers that previously many cases of this fever in man had been overlooked although it is possible that a strain of increased virulence has been produced.

In 10 of 24 samples of milk in the province of Utrecht *Br abortus* was recovered by inoculation of guinea-pigs.

For preventive measures the author suggests —

(1) Antiseptic precautions for those who are compelled to treat sick cows rubber gloves etc.

(2) Boiling or pasteurization of milk.

D H

SEELEMAN (M.) & HADENFELDT (A.) Ueber das Vorkommen von Banginfektionen beim Menschen. Uebersichtsreferat. Occurrence of *Abortus* Infection in Man. General Review — *Ztschr f Fleisch u Milchhygiene* 1928. Nov 1 Vol. 39 No. 3 pp 45-51 [46 refs.] [Prussian Exper Research Inst. for Milk Economics Kiel.]

The authors point out that although undoubted infections of man by *Br abortus* have been reported, and also occasional but not nearly so numerous infections in women yet *Br abortus* as a cause of abortion in women has not so far been proved.

They then review the recent German literature on the subject and point out the difference in infection caused on the one hand by wound infection and on the other by the ingestion of raw cows' milk.

Various papers by American, Dutch Italian and British authors are also referred to these papers have already been reviewed in this *Bulletin*.

The conclusions of the authors are that infection of man by *Br abortus* in cows' milk is now proved and that therefore careful pasteurization of the milk supply is more than ever necessary.

D H

BURNET (Et.) Sur le pouvoir pathogène du *M. melitensis* et du *B. abortus* pour le singe et l'homme. [Pathogenicity of *Br melitensis* and *abortus* for Monkey and Man.] — *C R. Acad Sci* 1928. Sept 24 Vol. 187 No. 13. pp. 545-548. [1 ref.]

Five years ago the author showed by experiment that *Br abortus* of bovine origin was non pathogenic for man and monkey and also

that man and monkey inoculated with *Br abortus* vaccine were immune to inoculation with *Br melitensis*. Objection was made to these experiments on the ground that they were carried out with cultures which had been long subcultured in the laboratory. In view of these objections, and also because cases of undulant fever in man due to infection from cattle suffering from contagious abortion have recently been reported from many countries the author has repeated his experiments using fresh cultures. The results obtained were exactly in agreement with the previous experiments except that in one instance, in a monkey there was slight illness and *Br abortus* was recovered from the blood. Three men inoculated under the skin with doses of 200 000 000 *Br abortus* did not develop any fever and had no symptoms whatever also they were resistant to subsequent inoculation with *Br melitensis* whereas a control volunteer contracted undulant fever.

The author considers that *Br abortus* is only slightly or rarely pathogenic for man or else there are special races of *Br abortus* which are capable of producing both abortion in cattle and fever in man. Another suggestion is that infection of cattle with *Br melitensis* has become widespread and this organism is capable of producing abortion in cattle and undulant fever in man.

D. H.

SARTORI (Carlo) Distribuzione e frequenza della febbre di Malta in provincia di Bologna. [Distribution and Prevalence of Undulant Fever in Bologna.]—*Arch Ital Sci Med Colon*, 1928, Jan. Vol. 9 No. 1 pp. 22-38. With 1 map in text. [Inst. of Trop. Path., Univ Bologna.]

A large part of this article is occupied with a description of the *Br melitensis* and its characters. The remainder gives a brief account of the distribution of undulant fever in the Province of Bologna with a spot-map showing the disease to be fairly general. Of purely local interest.

H. Harold Scott.

BURNET (Et.) Modifications biochimiques imprimées aux cultures de *B abortus* en vue de la préimmunisation contre la fièvre undulante. [Biochemical Changes Imprinted on Cultures of *Br abortus* with a view to Vaccination against Undulant Fever.]—*C. R. Acad. Sc.* 1928, Oct. 8. Vol. 187 No. 15. pp. 618-620 [1 ref.]

The author points out that according to the results of his experimental work *Br abortus* is but slightly pathogenic for man and that small doses of this bacillus can protect man and monkey from *Br melitensis* infection. He therefore suggests the use of a vaccine of *Br abortus* for the general protection of man and goats. As a preliminary research he has attempted to attenuate the coccus by growing it in bile broth. He compared such strains with strains which had not been so treated and found that on inoculation into guinea-pigs the bile-treated strains had lost practically all their virulence as compared with the untreated strains. He therefore suggests the use of such modified strains as a living vaccine for the protection of goats and man.

D. H.

SANFILIPPO (E.) & MIGNECO (G.) Untersuchungen ueber Immunisierung gegen Mittelmeerfieber II Mitteilung Ueber die Infektion der weissen Ratte. [Researches on Immunization of White Rats against Undulant Fever]—*Ztschr f Immunitätsf u Experim. Therap* 1928. Vol. 58. No 5-6. pp. 389-399 [12 refs.] [Med. Clinic, Univ Catania.]

The authors point out that the pathogenicity of *Br melitensis* for laboratory animals e.g. rats has not been clearly worked out and such reports as are available are not in agreement. They therefore have carried out a large series of experiments on white rats using cultures of this coccus.

In one point they confirm the work of previous investigators and that is, that it is extremely difficult to produce agglutinins to *Br melitensis* in the blood of rats. The first table shows the results of intraperitoneal injections of large doses of living *Br melitensis*. The virulence of the culture was maintained by rat passage and was such that half of the growth of a 48-hour culture on agar killed a rat of 90 gm. in 24 to 48 hours. The washings of such a growth suspended in normal saline were injected intraperitoneally into white rats in doses from 0.1 cc. to 0.5 cc. In doses less than 0.5 cc. the rats showed transient illness and subsequently recovered and when killed 20 days later no signs of infection could be found and it was not possible to recover the coccus from the organs but in doses of 0.5 cc. severe illness developed and the animals died in 24 to 48 hours, although in a few cases death was postponed until the fourth day. Agglutination tests were negative. At post mortem the micrococcus was obtained in pure culture and the organs showed the characteristic pathological anatomical signs of a septicaemia. In one rat a bilateral orchitis was noticed.

A further series of experiments were carried out to determine how many days it takes for rats infected with a sublethal dose to clear themselves of the germ. As early as the sixth day no germs could be detected, but after the injection of larger doses (up to 0.4 cc.) positive cultures were obtained up to the twelfth day.

In order if possible to produce a prolonged illness in rats comparable to the disease in man two methods were adopted. (1) inoculation with micrococci attenuated by exposure to heat at 55 C. (2) rats which had been previously partially immunized with doses of cocci killed by means of gold chloride were subsequently inoculated with large doses of living cocci. Such animals showed a severe illness for a time six to ten days, and then apparently completely recovered. Death, however may occur suddenly even several weeks later. The rats were killed from one to three months after the illness and on examination the coccus could still be recovered from the lymph glands spleen and bone-marrow. In three of the rats small abscesses were noted in the liver and *Br melitensis* was recovered from the pus in pure culture in one case and mixed with other organisms in the other two.

D H

CAZALAS (Xavier) Un cas de fièvre ondulante. Valeur thérapeutique de la Mélitine de Burnet. [Case of Undulant Fever. Therapeutic Value of Melitine].—*Paris Méd* 1928. Aug 25 Vol 18 No 34 pp 161-166 With 1 curve.

The author rightly states that so many cases of undulant fever due to *Br melitensis* or *Br abortus* have been recently described that to

describe another single case seems unnecessary but his excuse is that he wishes to draw attention to the excellent results obtained by the therapeutic use of intradermal and intramuscular injections of melitine which he obtained from Dr BURNET

The case was that of a native soldier whose fever had lasted for some six months before a diagnosis of undulant fever was made. The explanation given is twofold (1) That the fever was not undulant, but frankly remittent (2) that on three occasions blood cultures were taken and all were returned as sterile. The failure to obtain a positive blood culture is attributed to the fact that the cultures were only retained in incubation for 12 days. A fourth blood culture taken late in the disease was kept for one month and on the 28th day became positive. As soon as the diagnosis was confirmed melitine prepared locally by filtering 12 days broth cultures of *Melitensia*, was administered intradermally and gave positive reactions, but had no effect on the temperature. However when some melitine prepared by Dr BURNET was received and four doses of this were given, the temperature fell to normal and remained so and the patient made a good recovery.

The weak point in the case is as the writer himself points out, that before melitine was administered the man had already had nearly eight months' fever and therefore may have made a spontaneous recovery. The fact that the locally-prepared melitine given a few days earlier had no effect would seem to support this conclusion.

The author wishes to emphasize three points

- 1 Undulant fever may be a misnomer
- 2 In any prolonged remittent fever blood cultures should be made and kept at least one month in the incubator before being dismissed as sterile
- 3 Try the therapeutic effect of melitine early in undulant fever intradermally and intramuscularly the dose for the latter route being 0.5 cc

D. H.

DARRE (H.) & LAFFAILLE (A.) Un cas de fièvre de Malte guéri par les injections intraveineuses de trypanavine [Case of Undulant Fever cured by Intravenous Injections of Trypanavine]—*Bull Acad. Méd.* 1928 Oct 16 Year 92 3rd Ser Vol 100 No 34 pp 899-1003 With 1 chart

This paper describes the treatment, by means of trypanavine, of a ¹⁾case of undulant fever diagnosed by positive blood culture. The fever had already lasted for 2 months in spite of injections of melitine and, as far as could be deduced from the condition of the patient, it might have continued for much longer. A dose of 0.10 gm. of trypanavine was given intravenously without effect, but on the administration of a dose of 0.20 gm. the fever fell by crises and remained normal for several days, when there was a relapse. A second dose of 0.20 gm. was then given and the temperature fell to normal next day, remained normal, and the patient quickly convalesced. The authors strongly recommend a trial of this drug in the treatment of undulant fever and suggest that even larger doses, 0.4 gm., may be given.

D. H.

PODDIGHE (Antonio) Settlicemia emorragica da melitense. [Hæmorrhagic Forms of Undulant Fever]—*Polidimico. Sez. Prat.* 1929 Jan. 28 Vol. 36 No. 4 pp. 122-125.

Three interesting cases are recorded. All were proved to be undulant fever by positive hæmoculture.

In the first, on the ninth day of illness, there was profuse hæmaturia and blood continued to be present for forty days. The fever continued

on and off for five months. The second showed marked pulmonary symptoms and in the second week haemoptysis with clots of blood in the sputum was present. Soon after livid dark brown patches of cutaneous haemorrhages appeared in size up to that of the palm of the hand and distributed generally over the body. The fever in this patient was of a continued remittent type lasting for 30 days. The third had a similarly sudden onset, but on the fifteenth day developed signs of pleuritic effusion and exploration withdrew haemorrhagic fluid. On the next day there were indications of abdominal effusion, and paracentesis here also showed a dark blood-stained fluid. On the same day four or five small subcutaneous ecchymoses appeared. Recovery was prolonged. In fact, cure was not complete for many months.

H Harold Scott

DORIA (Raimondo) Sopra un caso d'infezione da bacillo di Bang nell'uomo [A Case of Human Infection by *Br abortus*].—*Polislinico Sez Prat* 1929 Dec. 3 Vol. 35 No 48 pp 2385-2398 2389 [6 refs]

The patient a man of 22 years suffered from periodic attacks of fever each lasting one to two weeks with several days intermission. He had lived in a district where an epizootic of abortion in cows prevailed. His serum agglutinated *Br melitensis* 1:300 at room temperature and after heating to 56 C., but was negative after heating to 65 C. with *Br abortus* agglutination occurred in a dilution of 1:800 and after heating to 65 C. in 1:400. Treatment with *melitensis* vaccine brought no benefit. The diagnosis is based on the history and these serological results.

H Harold Scott.

PARKER (William G) A Case of *Bacillus abortus* Infection.—*Jl Amer Med Assoc* 1928 Oct 27 Vol. 91 No 17 p 1289

This is a report of a mild case of undulant fever in a farmer aged 29. Blood culture and agglutination test were both positive for *Br abortus*. It was considered that infection was contracted by drinking the raw milk of a cow which had aborted about two months previously. The fever only lasted one month and the author considers that the therapeutic use of metaphen aided recovery.

D H

VIDAL (Joseph) & ABELLA (Rosendo) La différenciation du *Micrococcus melitensis* et du bacille de Bang par les agglutinines. [Differentiation of *Br melitensis* and *abortus* by Agglutinins].—*C R Soc Biol* 1928 Oct. 26 Vol 99 No 29 pp. 1271-1273 [3 refs] [Municipal Bact Lab Barcelona.]

The authors tested various types of emulsions of *Br abortus* and *Br melitensis* against the serum of a cow that had recently aborted. The emulsions were either treated with bile or heated or were normal emulsions. They could not find any notable difference in the results obtained. Two goats were inoculated with living emulsions of *Br abortus*. 18 days later they were bled and the sera tested for agglutinins. The results were interesting. The serum of No 1 goat agglutinated emulsions of *Br melitensis* both bile-treated and normal, in higher titre than it did emulsions of *Br abortus*. The serum of goat No 2 agglutinated best the bile-treated emulsions of *Br melitensis* and in lower titre but all equal the normal emulsions of *Br abortus* and *melitensis* and the bile-treated emulsions of *abortus*.

They therefore decided that nothing was to be gained by using bile-treated emulsions and in their further work employed normal emulsions suspended in saline.

They examined the sera of 258 cattle which had been killed in the slaughter-house and of these 90 agglutinated *Br abortus* at or above a dilution of 1/200.

TABLE.

Sera analysed	258
Positive for <i>melitensis</i> and <i>abortus</i> in titre above 1/200	90
Number of infected cattle	35
Sera agglutinating <i>abortus</i> and <i>melitensis</i> equally	41
Sera agglutinating <i>melitensis</i> in higher titre	11
Sera agglutinating <i>abortus</i> in higher titre	18
Sera agglutinating only <i>melitensis</i>	11
Sera agglutinating only <i>abortus</i>	11

The authors conclude that it is not possible to separate *abortus* from *melitensis* by agglutination tests and bile-treated or heated emulsions are of no assistance for this purpose.

D. H.

VIDAL (J.) Sur la différenciation du *Micrococcus melitensis* et du *Bacillus abortus* par des substances chimiques. [Differentiation of *Br melitensis* and *abortus* by Chemical Substances.]—C. R. Soc. Biol. 1923. Oct. 28. Vol. 90. No. 29. pp. 1279-1280. [1 ref.] [Municipal Bact. Lab. Barcelona.]

Certain writers have suggested that agglutination by chemical solutions may be utilized to separate *Br melitensis* from *Br abortus*. A 1 per cent. solution of lactic acid has been used and has been stated to agglutinate *melitensis* and not *abortus*. Vidal tried this out. He used 17 strains of *melitensis* and six of *abortus*. Ten of the *melitensis* strains were agglutinated and seven were not, whereas, all the *abortus* strains were agglutinated by the lactic acid solution. He suggests that possibly the discrepancy may be due to difference in the medium in which the organisms were grown. He therefore prepared an apparatus by means of which he grew *abortus* and *melitensis* in the same sample of broth but separated by a filter candle. After one month of this symbiosis six of the strains of *melitensis* which had previously been inagglutinable by lactic acid were now agglutinated and one strain still remained as before. The author concludes that acid agglutination is of no assistance in differentiating *abortus* strains from *melitensis*.

D. H.

BOAK (Ruth) & CARPENTER (C. M.) The Thermal Death Point of *Brucella abortus* in Milk.—Jl Infect Dis. 1923. Oct. Vol. 43. No. 4. pp. 327-329. [6 refs.] [New York State Vet. College, Cornell Univ. Ithaca.]

Owing to the difficulty of obtaining cultures of *Br abortus* from milk, previous reports regarding the thermal death point have been scanty and contradictory. It has been stated that the organism is killed by exposure to 55° C. for two hours, at 60° C. for ten minutes and at 65° C. for five minutes. More recently PARK has found that a temperature of 140° F. for ten minutes was sufficient to sterilize an emulsion containing 5 000 million per cc. of the organism. At 145° F.

only five minutes exposure was necessary. The author of the paper under review used eight strains of *Brucella* four derived from cows' milk, three from human cases of the disease and one porcine strain. The method used was to inoculate tubes of whole milk with the strain to incubate for 48 hours and then fill into glass bulbs which were sealed and completely submerged in the water-bath. The temperatures employed were 140° F, 142° F and 145° F and the times 5, 10, 15 and 20 minutes. The bulbs were then removed from the water, quickly cooled and opened, and tubes of soft agar inoculated and incubated. The remainder of the milk was then inoculated intraperitoneally into guineapigs.

It was found that the porcine strain was most resistant to heat being still alive after 15 minutes at 140° F but it was no longer grown after 20 minutes exposure at the same temperature and also was killed by an exposure of 5 minutes at 145° F. The other strains were all killed at 140° F after 15 minutes exposure and an exposure for 1 minute at 160° F killed all the strains.

D. H.

BRUGI (Antonio). La glicemia nella infezione melitense. [*Glycaemia in Undulant Fever*].—*Riforma Med.* 1928. Oct. 8. Vol. 44. No. 41. pp. 1305-1308. With 2 graphs. [37 refs.] [Inst. of Med. Clin. Univ. Pisa.]

The author estimated the sugar in the blood free and combined the former by Bang's method, the latter by that of Condorelli, in 19 cases of undulant fever. Five of these were severe, seven of average severity and seven mild, all proved by haemoculture and by agglutination. He divided the investigations into three groups according to the stage of the disease: (1) in the febrile period, (2) in the early afebrile, that is the first 10 days, (3) in the permanent afebrile period, after 20 days' apyrexia when convalescence had set in.

In the first he found a constant increase of the blood-sugar both fasting and after ingestion of glucose 150 gm. in 200 cc. water. In the second a diminution and in the third the figures fell to normal. The changes are ascribed to the glycogenic and glycoregulating functions of the liver. At no time was any glycosuria discovered. The detailed figures on which the above statements are based are presented in tabular form.

H. Harold Scott

They therefore decided that nothing was to be gained by using bile-treated emulsions and in their further work employed normal emulsions suspended in saline.

They examined the sera of 238 cattle which had been killed in the slaughter-house and, of these 90 agglutinated *Br. abortus* at or above a dilution of 1/200.

TABLE.

Sera analysed	236
Positive for <i>melitensis</i> and <i>abortus</i> in titre above 1/200	90
Number of infected cattle	35
Sera agglutinating <i>abortus</i> and <i>melitensis</i> equally	41
Sera agglutinating <i>melitensis</i> in higher titre	11
Sera agglutinating <i>abortus</i> in higher titre	16
Sera agglutinating only <i>melitensis</i>	11
Sera agglutinating only <i>abortus</i>	11

The authors conclude that it is not possible to separate *abortus* from *melitensis* by agglutination tests and bile-treated or heated emulsions are of no assistance for this purpose.

D. H.

VIDAL (J.) Sur la différenciation du *Micrococcus melitensis* et du *Bacillus abortus* par des substances chimiques. [Differentiation of *Br. melitensis* and *abortus* by Chemical Substances.]—C.R. Soc. Biol. 1928. Oct. 26. Vol. 89. No. 29. pp. 1279-1280. [1 ref.] [Municipal Bact. Lab. Barcelona.]

Certain writers have suggested that agglutination by chemical solutions may be utilized to separate *Br. melitensis* from *Br. abortus*. A 1 per cent solution of lactic acid has been used and has been stated to agglutinate *melitensis* and not *abortus*. Vidal tried this out. He used 17 strains of *melitensis* and six of *abortus*. Ten of the *melitensis* strains were agglutinated and seven were not, whereas, all the *abortus* strains were agglutinated by the lactic acid solution. He suggests that possibly the discrepancy may be due to difference in the medium in which the organisms were grown. He therefore prepared an apparatus by means of which he grew *abortus* and *melitensis* in the same sample of broth but separated by a filter candle. After one month of this symbiosis six of the strains of *melitensis* which had previously been inagglutinable by lactic acid were now agglutinated and one strain still remained as before. The author concludes that acid agglutination is of no assistance in differentiating *abortus* strains from *melitensis*.

D. H.

BOAK (Ruth) & CARPENTER (C. M.) The Thermal Death Point of *Brucella abortus* in Milk.—*Jl Infect Dis.* 1928. Oct. Vol. 43. No. 4. pp. 327-329. [8 refs.] [New York State Vet. College, Cornell Univ. Ithaca.]

Owing to the difficulty of obtaining cultures of *Br. abortus* from milk previous reports regarding the thermal death point have been scanty and contradictory. It has been stated that the organism is killed by exposure to 55 C. for two hours, at 60 C. for ten minutes and at 65 C. for five minutes. More recently PARK has found that a temperature of 140 F. for ten minutes was sufficient to sterilize an emulsion containing 5,000 million per cc. of the organism. At 145 F.

Post mortem there was not much to be noted the spleen was not enlarged except in old malarial subjects the liver however was enlarged and the kidneys showed parenchymatous changes the heart muscle also was degenerated as the result of a toxæmia there was congestion of the alimentary canal and small hæmorrhages were noted in the mucous membrane of the stomach

Laboratory Research—A leucopenia with relative lymphocytosis was noted. Investigations for the discovery of a spirochaete such as that described by COUVY were entirely negative.

The fact that the disease can be conveyed to healthy susceptible people by means of inoculations of the whole blood or serum from cases of the disease was confirmed as also was the transmission by the bite of mosquitoes

Treatment—Copious acid drinks milk diet and symptomatic treatment

Prophylaxis—If the first cases of an outbreak could be detected and isolated under nets or in screened wards the epidemic would be arrested. The destruction of all breeding places for *Stegomyia* is extremely difficult and can only be done over a period of years orders have now been issued regarding the necessary precautions.

D H

SARCORAPOS (M) Estudio clinico sobre el dengue. [*Dengue a Clinical Study*].—*Siglo Méd* 1928. Oct. 20 Year 75 Vol. 82. No 3906. pp 376-378.

An interesting account of the outbreak in Greece by the Professor of Clinical Medicine at Athens. He shows that the disease in some cases presented considerable departures from the usual text book description. Thus the onset was sudden in about 15 per cent. only and was usually preceded by headache anorexia, and vague symptoms for a day or two. Though in most cases the temperature rose to 30.5 C. or thereabouts in others it was as high as 41° C with a pulse of 70 per minute. In rarer cases the rate might fall as low as 40 and be accompanied by syncope. The muscular pains and neuralgia might be very acute and did not as is commonly stated subside with fall of temperature. Some had little or no pain even with high temperature in others though the temperature was low the pain was excruciating. Haematemesis was not infrequent sometimes so severe as to lead to more than a suspicion of gastric ulcer epistaxis intestinal hæmorrhage and metrorrhagia were common. Haemoptysis was only seen when tuberculosis co-existed. The liver was in many cases enlarged, jaundice might be marked and last for 15-20 days. Pain over the liver area was sometimes intense and extended to the shoulder in fact the symptoms were strongly suggestive of cholelithiasis.

Convalescence was often tedious and prolonged debility was marked and bradycardia persisted, perhaps for weeks

As regards treatment in an ordinary case urotropine alone was given if the pains were severe aspirin pyramidon and caffeine for the general and mental distress which in some patients was an important feature bromides with salicylates and strophanthus. Quinine was useless unless malaria was associated with the dengue.

H. Harold Scott.

PONTANO (T) La pandemia di dengue in Atene. [The Pandemic of Dengue in Athens.]—*Policlinico. Sez. Prat.* 1928. Nov 5 & 12. Vol. 35. Nos. 44 & 45 pp 2143-2150 2153-2154 2200 2206. With 9 charts in text.

Professor Pontano in this article gives an account of the recent epidemic of dengue and of the special directions in which the usual symptoms were departed from. In the main as would be expected, he was struck by the same peculiarities as others who have written on this outbreak. Among the symptoms to which he draws particular attention are the early and severe gastro-intestinal phenomena on the first to third days, the dryness of the skin and absence of sweating even when the temperature fell by crisis or rapid lysis. In common with others he notes the frequency of hæmorrhagic cases—cutaneous hæmorrhages epistaxis hæmatemesis and intestinal bleeding. Nervous symptoms were prominent in some, giving the picture of a meningitis encephalitis, myelitis or a polyneuritis. The renal complications in severe cases are also commented upon, and cases occurred (a temperature chart is given in illustration) of definite relapses, repeating the course of the primary attack after an apyrexial interval of eight days.

H. Harold Scott.

LIVIERATO (Spiro) & VAGLIANO (M) Forme cliniche speciali della dengue e rispettiva terapia. [Special Clinical Types of Dengue and their Treatment.]—*Riforma Med.* 1929 Jan. 5. Vol. 45. No. 1 pp. 12 15-16. [Inst. of Clin. Med. National Univ. Athens.]

In the recent epidemic of dengue at Athens amongst the large number of ordinary typical cases, certain peculiar types were met with in which the brunt of the disease appeared to fall upon one particular organ. The authors give illustrative cases of three of these types.

1. *Hepatic* Initial symptoms in these might include epistaxis or hæmatemesis with subicteric tint of the skin. By the sixth day purpuric hæmorrhages were seen, the pulse became progressively slower jaundice more marked and the liver enlarged and tender. Three instances of this are detailed. somnolence was present in all, which deepened to coma in two who died the third began to improve on the twelfth day but convalescence was slow. 2. *Cardiac* Two cases of this are mentioned. In both the evolution of the disease appeared to be normal till the sixth day in the first, the twelfth in the second. In the first, at this time signs of myocardial mischief appeared—soft sounds, increasing frequency of pulse and cyanosis, and death took place in a few hours. In the second death occurred suddenly with syncope. 3. *Nervous* with signs of meningitis or meningo-encephalitis, intense headache rigidity positive Kernig and Brudzinski signs, delirium, excitation, mental confusion and psychical disturbances. These symptoms made their appearance on the fifth day of what up to that time had seemed to be ordinary typical cases. Two are described. In the second of which the psychic symptoms were very marked. The patient suddenly developed a violent fit of anger broke everything breakable within reach and threatened to kill everyone in the house. He then became delirious and declaimed for hours at a time whole pages of Thucydides and other classic authors (he was a gymnasium professor). These attacks began to subside on the fourteenth day convalescence set in by the sixteenth and was uninterrupted.

As regards treatment there is but little to say. It is almost entirely symptomatic, salicylates aspirin, pyramidon, for the pains hydro-

therapy for the fever. Urotropine in large doses proved serviceable. Salvarsan injections were valueless in the authors' hands.

H Harold Scott

PORTOCALIS (A.) & FLORA (G.) Syndrome vagotonique au cours de la dengue. [*Vagotonic Syndrome in Dengue.*].—*Bull et Mém Soc Méd Hôpitaux de Paris* 1928. Nov. 29. Year 44. 3rd Ser. Vol. 52. No 32. pp 1594-1604

During the epidemic of dengue in Athens in August and September of last year the authors noted a great many cases in which the clinical picture differed markedly from that seen in the ordinary acute infectious diseases. The chief differential symptom was a slow pulse (40-70 per minute) when the temperature was 40 C. such a condition is not common in acute fevers. Other symptoms which went to complete the picture were low blood pressure profuse sweats multiple small haemorrhages and asthmatic seizures the whole clinical picture in the authors' opinion being summed up in the term *hypervagotony* and being evidence of a condition of acute suprarenal insufficiency.

Numerous cases are cited and in a summary the various symptoms mentioned above are analysed.

D H

BLANC (Georges) & CAMINOPETROS (J.) Expériences faites en Grèce sur le mode de transmission de la dengue. [*Experiments in Greece on the Mode of Transmission of Dengue.*].—*C R Acad Sci* 1928. Dec. 3. Vol. 187. No 23. pp 1081-1083. [1 ref.]

The authors point out that in Greece confusion exists between sandfly fever and true dengue and some writers have suggested that dengue can be carried by the sand fly.

They fed *Stegomyia* on cases of dengue and also collected mosquitoes of the same species in rooms where there were cases of dengue. They then conveyed these mosquitoes to an island off the coast of Crete where dengue was unknown the two lots of mosquitoes were ground up in saline and injected into seven volunteers all seven contracted the disease. In another experiment they used laboratory bred mosquitoes and fed these on cases of dengue on the first and second day of the disease they then conveyed these to a district where dengue did not exist and fed them on volunteers 6 9 12 20 and 28 days after the infecting feed all the volunteers contracted the disease except the man who had been bitten on the sixth day after the infecting feed.

Again some mosquitoes (*Stegomyia*) were collected in a house where dengue cases were present and fed on three volunteers one of these volunteers contracted dengue on the other hand *Culex* mosquitoes collected in the same rooms did not give rise to infection.

D H

GEORGOPOULOS (M.) Die Prüfung des Zustandes der peripheren Gefässe als Methode zur frühzeitigen und sicheren Diagnose des Denguefiebers. [*Test of the State of the Peripheral Vessels in the Early Diagnosis of Dengue*].—*Munch Med Woch.* 1928. Oct. 19. Vol. 75. No 42. pp. 1793-1794. [Evangelismos Hosp Athens.]

The author noted in the recent pandemic of dengue in Athens that one of the most common symptoms was the appearance of haemorrhages

from the lung the nose the gastro-intestinal tract, from the kidneys and from the bladder. He suggests as an explanation that the unknown virus of the disease causes damage to the walls of the blood vessels. With the view to obtaining proof of the correctness of this suggestion, he carried out a systematic investigation of the condition of the peripheral blood vessels in cases of dengue.

The investigation was carried out by means of the Rumpel Leede test in which a bandage is applied tightly to a limb and, on removal, if the result is positive petechial haemorrhages are seen. This test was positive in practically all the cases of dengue tested by the author and usually appeared by the first day of the disease.

The other test employed was that of Marwitz and Denecke which is carried out as follows. Blood is taken from a vein. The circulation in the artery and vein are then stopped by means of a tight bandage and the arm is held upright for 12 minutes. At the end of that time a second sample of blood is taken from the vein and the two samples are left overnight in the ice chest. Next day the expressed sera are examined and, in a positive test, i.e. people with damaged blood vessels it will be found that there is a thickening of the serum due to loss of water through the walls and a corresponding increase of the albumen content. On the first day of the disease a few only of the cases showed a thickening of the sera, but by the third day nearly all the dengue cases showed this condition i.e. a positive Marwitz Denecke test.

The author suggests that as Rumpel's phenomenon appears on the first day of the disease, a positive reaction on that day might be utilized as an aid to diagnosis, whereas a negative result up to the 3rd day would exclude a diagnosis of dengue.

At the same time it is pointed out that a positive Rumpel reaction may be got in cases of scarlet fever typhus and malignant endocarditis also there are other conditions in which a positive Denecke reaction can be obtained and therefore it is not of so much value on that account and one must rely also on the clinical features to distinguish dengue from scarlet fever typhus, etc.

D. H.

VERA (Solone) La dengue nei bambini. [Dengue in Children.]—*Pediatrico Sez. Prat.* 1929 Feb. 18. Vol. 36. No. 7 pp. 227-229

Contrary to a fairly common belief that children are not attacked by dengue the author met with cases in infants at the breast. His remarks are based upon 27 cases varying between three months and fifteen years of age. The symptoms may be the same as those in adults but in many instances there are considerable differences. The disease may set in with a convulsion, the fever often persists for six days and though there is restlessness with anorexia, the acute pains characteristic of adult cases appear to be absent vomiting is frequent and epistaxis not rare. Two of the patients relapsed after an apyrexial interval, in one of 8 days. Examination of the blood gave varying results. In some there was leucopenia, in others a normal count, and in others again a leucocytosis. Infection seemed to confer a certain degree of immunity since it was rare to find an individual who had suffered in the 1927 outbreak being attacked again in that of the following year.

H. Harold Scott.

SYPHANTOS (Sp) Aperçu clinique sur une épidémie de fièvre dengue.
[Clinical Description of an Epidemic of Dengue.]—*Presse Méd*
1928 Dec. 29 Vol. 36 No 104 pp 1668-1669.

This paper gives a clinical description of cases of dengue under the care of the author. There is nothing new or out of the way in the symptoms recorded, but the author notes that the conjunction of intense headache with bright red injection of the conjunctiva and congestion of the anterior pillar of the fauces may be looked upon as diagnostic in the very early stages of the disease.

D H

TOURNIER (E.) & GUÉNOLE (A.) Epidémie de dengue hivernale en Chine du Nord. [Winter Dengue in North China]—*Bull Soc Path. Exot.* 1928. Oct. 10 Vol. 21 No 8. pp 617-619
With 1 chart.

The authors describe a small epidemic of dengue which occurred among the native soldiers of the garrison of Shanhaikwan in North China, 40° N. Only the soldiers in one barrack room suffered, those in neighbouring barrack rooms entirely escaping. There were 14 men in this room and 12 of them were taken ill. The symptoms were typical of severe dengue with high fever and profuse rash and all the cases had relapses or recrudescences of fever and severe pains in the back and limbs with some oedema. An interesting point was that two of the men in the course of convalescence developed a pseudo-tabetic condition with complete loss of knee-jerk but no Argyll-Robertson phenomenon.

The authors are convinced that no biting insect of the nature of mosquito or sand fly could be concerned in the conveyance of the disease as the time was mid winter and the temperature was -20° C and that, therefore the infection must have been direct from case to case and since the cases were isolated early they must be infectious in the incubation period as in other eruptive fevers.

D H

MORIN (Henry G S) & PIROT (R.) Sur l'épidémiologie de la dengue d'Extrême-Orient. [Epidemiology of Dengue in the Far East.]—*Arch Insts Pasteur d'Indochine.* 1928. Apr-Oct. No 3 & 4 pp 41-50 [35 refs.]

The authors refer to the work of the American authorities in Manila. In the American troops the three chief causes of sickness of late years have been venereal disease malaria and dengue although the admissions to hospital for the first two have been reduced in later years in a remarkable manner little reduction has been noted in the dengue figures. The admissions to hospital for this disease correspond in a remarkable manner to the distribution in time and place of *Stegomyia fasciata* and the rôle of this mosquito [*Aedes aegypti*] as vector was experimentally proved.

The present paper gives an account of an outbreak of dengue which commenced on board a ship in the harbour at Saigon the first case occurred in a man who had been on leave to Cap Saint Jacques and who developed the fever on his return, the remainder of the crew went down with dengue and the infection spread to other ships and to the barracks on shore.

The first patient was suddenly taken ill on 28th April, on 15th May three of the sailors went down with dengue and from that day onwards fresh cases arose from the 1st June seven to eight cases a day were admitted.

The interesting point from the authors point of view is the period that elapsed from the day that the first case occurred until the disease commenced in the remainder of the crew. Also in other ships which were moved from anchorage in the middle of the river into dock, cases commenced to occur in the crews five days after the move.

Thus if the first case was bitten on the 28th April, then the mosquito would become infective about 9th May (11 days incubation) and if it then bit the healthy men they would develop fever on 15th May (6 days' incubation) which was the first day of the outbreak on the ship.

D. H.

NICOLAS (Ch.). A propos d'une épidémie de dengue compliquée d'ictère. La dengue serait-elle une fièvre amarille atténuée? [Dengue complicated by Jaundice. Relation to Yellow Fever.]—*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9 pp. 748-752.

In the district of Thio New Caledonia, the author saw in the course of his duty some 20 cases of dengue of which eight suffered from severe jaundice as a complication. The eight cases are described in detail one was fatal, a girl aged eight who had jaundice and "black vomit." The differential diagnosis in this case between yellow fever and dengue was extremely difficult. He adds that many authors have insisted on the close relation between these two diseases and some have described dengue as a mild form of yellow fever.

D. H.

NICOLLE (Charles). Un nouvel exemple d'infections inapparentes. A propos de la découverte faite par G. Blanc, J. Caminopetros et E. Manoussakis de la dengue inapparente de l'homme et de celle du cobaye. [Inapparent Infection of Dengue in Man and Guinea-pigs.]—*Arch. Inst. Pasteur de Tunis* 1928. Dec. Vol. 17. No. 4 pp. 356-362. [2 refs.]

The author points out that what he means by infection inapparente, a term introduced in 1919 is an acute attack of a disease with a septicaemia, having an incubation period and a definite course followed by immunity but without any clinical symptom and yet during the period of the infection the blood is infective. [BALFOUR's expression "cryptic trypanosomiasis" seems to express the same idea.]

BLANC, working in the Pasteur Institute of Athens found that, in certain cases, susceptible volunteers inoculated with small doses of infective blood gave no reaction. At first he was inclined to think that the dose was too small and that the volunteers had escaped infection, but on inoculating the blood of such men after a lapse of five days into fresh susceptibles, these contracted the disease and the original volunteers proved resistant to massive doses of infective blood, although their own blood was then non-infective, i.e. they had recovered from an attack of inapparent dengue and were immune.

The same phenomenon was demonstrated in guinea-pigs these animals showed no reaction when inoculated with infective human

blood but when the guineapig blood was later inoculated into a human volunteer he developed a typical attack of dengue.

The same experiment was repeated with a like result. But it was found that if passage from guineapig to guineapig was attempted the blood was not infective for man, it was only in the first passage that this was so

D H.

ICHOK (G) La dengue. [Dengue.]—*Rev d'Hyg et de Méd Préven* tne. 1928. Dec. Vol. 50 No 12. pp 900-908. With 1 text fig [29 refs.]

As a result of the recent widespread epidemics of dengue in Southern Europe many alarmist and erroneous articles have appeared in the lay press. With a view to counteracting the impressions gathered from these writings the author gives a full and accurate account of our knowledge of the disease up to date.

The first part is historical and deals with previous European epidemics of 1889 and 1899 an interesting note is that probably the first clinical description of the disease was made by British Army doctors in India in the year 1824

A full clinical description of the disease follows and the differential diagnosis from yellow fever influenza and sand fly fever is discussed. The author points out that all persons seem to be susceptible from the infant in arms to the old man of 80 years.

D H.

LE GAC. Notes sur quelques cas de fièvre à Pappataci observés à Abéché et sur les phlébotomes du Ouadal (Tchad) [Cases of Pappataci Fever seen at Abéché (Chad)]—*Ann. de Méd et de Pharm. Colon.* 1928. Apr-May-June. Vol. 26 No 2. pp. 215-227

Some cases of so-called climatic fever are described which occurred in the district of Abéché. The chief symptoms were fever for three days or so *slow pulse* intense retroocular headache, backache stiffness of the neck and cramp in the limbs a leucopenia with relative lymphocytosis and slow convalescence. Malaria was excluded by careful blood examination and dengue by reason of absence of any rash this also served to exclude seven-days fever. The author concludes that this so-called climatic fever is in truth sand fly fever. Two species of phlebotomus were found in large numbers in the district, *P minutus* and *P Dubosqui*

D H.

UNCLASSED FEVERS

- i. PLATY & MARÇON Fièvre exanthématique et typhus endémique bénin. [Eruptive Fever and Endemic Typhus.]—*Marseillo-Médical.* 1928. Dec. 5 Vol. 65 No 34 pp. 705-711 [3 refs.]
- ii. — MARCANDIER & MARÇON Contribution à l'étude de la fièvre exanthématique ses rapports avec le typhus endémique bénin. [A Contribution to the Study of Eruptive Fever and its Relation to Benign Endemic Typhus.]—*Bull. Acad. Méd.* 1928. Dec. 28. Year 92. 3rd Ser Vol. 100 No 44 pp 1450-1456 [6 refs.]

i. The authors were originally of opinion that the eruptive fever of Marseilles and of Toulon were very closely related, and considered them to be a form of mild typhus similar to Brill's disease but on

consideration of fresh evidence they are inclined to believe that these are two distinct diseases although having many symptoms in common.

In the Marseilles fever the Weil-Felix reaction is almost constantly negative whereas in the Toulon cases it is positive up to a dilution of 1:280 also the *tache noire* or primary lesion of the Marseilles fever has not been met with in the Toulon cases.

The Toulon cases with which the authors are primarily concerned, have been called typhoid by some, but the authors describe a case of Toulon fever positive Weil-Felix who in convalescence developed an acute attack of enteric fever with positive blood culture and Widal reaction.

The authors are convinced that the fever met with in Toulon whatever the Marseilles fever may be, is a mild form of typhus with which it is identical both serologically and clinically.

Lice have not been found on any of the cases, and the authors are investigating fleas and bugs as possible vectors.

Another interesting point is that the majority of the cases have been among the sailors of the Mediterranean fleet and from the ships which were at one time crowded with refugees in the Near East many of whom died of typhus.

ii. This paper records the result of an investigation of further cases of "eruptive fever" observed by the authors in Toulon and especially in the maritime population of that seaport. Although the majority of the cases occurred in the summer cases have now been met with in every month of the year. Five strains of *Proteus* X19 were utilized. The serum was used in dilutions from 1:20 to 1:280 and the result was read after the mixture of serum and emulsion had been in the incubator for one hour at 37° C. and 18 hours at room temperature.

All the cases observed by the authors gave a positive Weil-Felix reaction but this agglutination only appeared after the fever had ceased, and its maximum was reached between the 10th and the 20th day of apyrexia and disappeared at the end of one to two months. Inoculation of blood into guinea pigs produced no result.

Two illustrative cases are cited—one of these was severely ill, and forms a link between benign and true typhus both gave the characteristic curve of agglutination with *Proteus* X19 the more severe case giving the higher readings. The readings were negative during the febrile period.

The authors sum up by saying that this disease clinically and serologically resembles benign endemic typhus and if they cannot yet say the two diseases are one and the same yet they are convinced that they are closely allied and they are also of opinion that the "eruptive fevers" met with elsewhere on the Mediterranean littoral are on clinical grounds very similar.

D. Harvey

- i. OLMER (D) Nouvelles observations et recherches sur la "fièvre exanthématique. [New Observations on Eruptive Fever.]—*Bull Acad. Méd.* 1928. Oct. 16. Year 92. 3rd Ser. Vol. 100. No. 34. pp. 996-999. [1 ref.]
- ii. — & OLMER (J) Nouvelles observations et recherches sur la fièvre exanthématique—*Marseille Médical* 1928. Dec. 5. Vol. 65. No. 34. pp. 701-703.

i. This paper deals with the so-called "eruptive fever" of Marseilles. The author states that cases are increasing in number but the mortality

is small less than 3 per cent. and fatal cases occur only in debilitated persons or in those who are suffering from concurrent disease. He definitely excludes dengue as a possible diagnosis and gives chapter and verse for his opinion. He is also of opinion that the disease is non-contagious and that it is conveyed by insect bite (primary ulcer). As lice can in his opinion be definitely excluded, he suggests that the disease vector may be the dog tick (*Ixodes ricinus*)

In favour of this view he cites the following points —

- 1 The disease appears only in the summer
- 2 The frequency of the disease in rural areas.
- 3 The presence in immediate contact with the patients of sick dogs

which are heavily parasitized by ticks.

So far experimental confirmation of this suggestion has not been forthcoming as although ticks have been caused to bite monkeys and have also been injected into monkeys intraperitoneally no fever has resulted, whereas the blood of fever cases injected into monkeys has given rise to fever although guineapigs are apparently unaffected.

Although some of the cases give a positive Weil Felix reaction, this reaction is inconstant and quite unlike the results obtained in true typhus fever

ii. This paper gives some details of experimental work carried out on the Marseilles eruptive fever and its epidemiology. The authors repeated the attempts already made by themselves and others to infect guineapigs by injection of blood from patients and again failed to obtain any reaction but in monkeys the injection of blood has given rise to a febrile illness which can be passed on experimentally from monkey to monkey

With regard to the etiology the authors arrived at the conclusion that the reservoir of the virus might be some domesticated animal and they suggest the dog and its parasites notably the tick, *Ixodes ricinus*. However so far they have quite failed to infect monkeys either by the bite of the tick or by injection of a suspension of the tick ground up in normal saline.

They cite several cases of patients who have suffered from the fever and stated that they had been bitten by ticks previously and in whom the tache noire developed at the site of the tick bite.

Evidence has also been forthcoming from the veterinary surgeons who state that they have seen many dogs so covered with ticks that they die of fever and anaemia.

It is also suggested that the disease may be conveyed by the dog flea, or possibly that the field vole and its parasites are implicated.

D H

BOINET PIÉRI (Jean) & DUNAN Recherches nouvelles sur la fièvre exanthématique du littoral méditerranéen. [New Researches on Eruptive Fever]—*Presse Méd* 1928. Oct. 31 Vol. 38. No. 87 pp. 1377-1379 With 4 text figs.

— & — Recherches nouvelles sur la fièvre exanthématique du littoral.—*Marseille-Médical* 1928. Dec. 5 Vol. 65 No. 34. pp. 703-705

The authors are convinced that the Marseilles fever is neither true nor attenuated typhus neither its clinical course nor laboratory findings are in any way similar and its mode of transmission is also

different. This fever arises in the summer and is not contagious cases can be and have been treated in the general wards with cases of other diseases and no fresh cases arise. The disease is not new and has been known to occur sporadically for the last 30 years. The remarkable symptom which distinguishes it from other diseases, including typhus, is the primary sore, and this is probably the site of inoculation. The eruption is nodulo-papular and can be felt by the finger as raised points under the skin.

Histological examination of the tache and the papules for the lesions of typhus and for the presence of *Rickettsia* was made, but nothing resembling these bodies or lesions could be found.

An early lymphocytosis was noted followed by a polymuclear leucocytosis.

The Weil Felix reaction, although tested throughout the fever and on into convalescence with various strains (including "Kingbury") of *Proteus* was invariably negative. Inoculation of infective blood into guinea-pigs was negative.

The authors consider that lice and fleas can be excluded as possible vectors, but that it is highly probable that the disease is carried by ticks which are very numerous in the districts where the fever occurs.

D. H.

BURNET (Et.) DURAND (P.) & OLMER (D.). La fièvre exanthématique de Marseille est absolument distincte du typhus exanthématique. [Eruptive Fever Distinct from Typhus.]—*C. R. Acad. Sci.* 1928. Dec. 10 Vol. 187 No. 24. pp. 1170-1171 [1 ref.]

Burnet, Durand and Olmer set to themselves the query Is the "eruptive fever" of Marseilles an attenuated form of true typhus similar to Brill's disease?

They took three monkeys which had recently recovered from an attack of the fever experimentally produced, and showed them to be immune to the fever by tests with injections of blood from cases and infective material from other monkeys. They then inoculated the three monkeys with a known virulent typhus virus (brain of a guinea-pig). All three reacted to the virus in a typical manner after incubation periods of 7, 9 and 6 days respectively. They then took a monkey which had been immunized against typhus virus by means of repeated injection of the contents of infective lice and showed it to be immune to typhus virus this monkey was injected with the blood of a case of Marseilles "eruptive fever" and gave the typical positive reaction.

As a result of these crossed immunity experiments the authors conclude that the fever of Marseilles is in no way related to typhus.

D. H.

BURNET (Et.) DURAND (P.) & OLMER (D.). Essais de transmission de la fièvre exanthématique de Marseille par les poux. [Attempt to transmit Eruptive Fever by Lice.]—*C. R. Acad. Sci.* 1928. Dec. 3. Vo 187 No. 23. pp. 1084-1085.

Although it has been frequently stated that lice have not been found on patients suffering from the "eruptive fever" of Marseilles, yet the authors considered that it would be interesting to carry out some transmission experiments with these parasites. Two lots of lice were collected

and fed twice a day on monkeys suffering from ' eruptive fever ' experimentally produced. The first experiment was carried out by grinding up a number of these lice and injecting the emulsion into clean monkeys but none of these monkeys developed any signs of illness.

A second lot of lice were fed daily on monkeys suffering from fever and 5 to 17 days later were allowed to feed on healthy monkeys, and also were crushed up in saline and the emulsion injected into human volunteers all with negative results.

Such results are against the theory that this disease is allied to typhus or that it can be conveyed by lice.

D H.

OTT Note au sujet de la menace de typhus exanthématique récemment constatée dans le cara de Rakka, entre l'Euphrate et la frontière syro-turque. [Typhus at Rakka near the Syrian Turkish Border]—*Marseille-Médical* 1928. Dec. 5 Vol. 65. No 34 pp. 712-717

This paper deals with a small outbreak of endemic typhus among French colonial troops in the district of Rakka near the Syrian Turkish border. Two soldiers and one hospital orderly were the patients one recovered and two died. The point of chief interest was to discover the cause of the outbreak, since the two soldiers had been under treatment in hospital for six weeks for other diseases before the fever commenced on December 11th, and therefore the infection must have taken place in the hospital.

No cases of typhus had been notified in the neighbourhood and none among the troops but a careful scrutiny of the hospital records revealed that a body of mounted auxiliary Bedouin troops had recently returned from an expedition to the Turkish border and several of them had been admitted to hospital with severe malignant tertian malaria. One of these men died in hospital on 30th November and a study of his temperature chart and clinical records showed that he had probably died of typhus unrecognized at the time owing to the malarial complication another man who was on leave died at the same time of fever. The first case of typhus in the hospital commenced on 11th December.

Active measures were taken to isolate and disinfect contacts and a rigid quarantine of the front and of the towns was established and no more cases appeared.

D H.

MEDICAL & SCIENTIFIC ARCHIVES OF THE ADELAIDE HOSPITAL. 1927 No 7 pp 9-10—Case of Hone's Endemic Typhus-like Disease Death during Convalescence.

A male aged 53 admitted with a history of eight days illness. His face was flushed, florid dull and expressionless, and the conjunctiva were suffused. Scattered over the chest, abdomen, back and legs was a rash which became less marked towards the extremities and was absent from the hands and feet. The rash consisted of macules and papules and resembled a dirty measles rash and did not disappear on pressure. The Widal reaction was negative but the Weil Felix reaction showed complete agglutination in 1:80 and partial in 1:160 the case was accordingly diagnosed endemic typhus. The temperature fell by lysis and the rash faded but three days later pneumonia developed and the patient died.

The kidneys were enlarged and deeply congested and the spleen was enlarged dark red and soft, as also was the liver. Some agglomerations of polymorphonuclear cells were noted in the kidney and around the capillaries of the liver but no Rickettsia bodies were seen.

D. H.

GHOSE (G.). Typhus-like Fever. (Colonel Megaw & Tick Typhus F).—*Indian Med. Gaz.* 1928. Nov. Vol. 63. No. 11 pp. 634-636. With 4 figs. & 2 charts

Two cases are described in detail. The interesting point is that in both there was a clear history of insect bite some days before onset of the fever and this bite left a definite small ulcer similar to the "tache noire" of Marseilles fever and also both the patients kept dogs which were tick infested.

The rash is described as maculo-papular and could be felt by the finger as small nodules under the skin. This rash was present all over the body also on the face and palms of the hands. The eyes were much congested and red.

The Widal reaction for T. A. and B. was completely negative but unfortunately no report is given of the result of a Weil-Felix reaction.

D. H.

PAI (M. N.). Two Cases of (F) Tick Fever from Poona.—*Indian Med. Gaz.* 1928. Dec. Vol. 63. No. 12. pp. 704-705. With 1 chart.

The author describes two cases of typhus-like fever in soldiers in Poona. The points of interest are the profuse and persistent petechial rash which covered the entire body and face and did not fade for at least four weeks and the severe joint pains which were complained of in both cases.

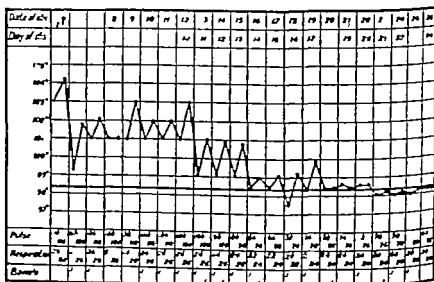


Chart illustrating typhus-like fever case in soldier in Poona.

[Reproduced from the *Indian Medical Gazette*]

The Widal reaction was negative and blood culture was sterile but there is no record of the Weil-Felix reaction and no history of tick bite nor of primary ulcer

D H.

YAGI (Tadaaki) [Klinische und experimentelle Untersuchungen ueber Fünftagefieber (I Mitteilung)] [Clinical and Experimental Investigations of Five Day Fever]—*Okayama-Igakkaï Zasshi (Zent d Okayama Med Gesellsch)* 1928 Aug Vol. 40 No 8. pp 1693-1723 With 5 graphs & 1 plate [228 refs.] [In Japanese. German summary p 1724] [Central Hosp., Kurashiki]

This is a description of a case of 5-day fever (trench fever) in a patient aged 72

[The English Commission on trench fever working with aged volunteers found great difficulty in infecting them by means of lice until it was discovered that these old men were not inconvenienced by the lice and did not scratch]

The principal symptoms were subjective and specially notable were the severe shin pains complained of. The fever occurred in paroxysms every fifth day and was invariably accompanied by a polynuclear leucocytosis which disappeared in the apyrexial periods. No parasitic cause of any kind could be found either in the blood or urine both of which were frequently examined. The treatment was symptomatic

D H

OROYA FEVER AND VERRUGA PERUANA.

NOGUCHI (H.) *Etiology of Oroya Fever XIII. Chemotherapy in Experimental Bartonella bacilliformis Infection.*—*Jl. Experim. Med.* 1928. Nov 1 Vol. 48. No 5 pp. 619-625 With 2 plates. [8 refs.] [Rockefeller Inst. for Med. Research New York.]

During his researches into the etiology of Oroya fever the late Professor Hideyo Noguchi took the opportunity of testing the therapeutic qualities of a series of drugs on his experimentally infected monkeys.

The following amongst others were tried out: salvarsan, neo-salvarsan, bismuth-lactate, esters of chalconoic acid, sodium gynocardate, neutro-flavine and urotropine.

Tested *in vitro* on cultures of *Bartonella bacilliformis* neutro-flavine and formaline were found to be most efficacious and acted in very low dilutions of the order of 1 in ten millions.

When tested on infected monkeys it was found that if the drugs were utilized when the verruga growth was fully developed, and had been present for several days the growth rapidly retrogressed and disappeared whereas if the drugs were administered when the growth was in the early stages they had no effect whatever on its development.

The drugs were administered intravenously

D Harvey

DA CUNHA (Aristides Marques) & MUNIZ (Julio) [In Portuguese & German] *Pesquisas sobre a Verruga peruana. Untersuchungen ueber die Verruga Peruviana.* [Investigations into Verruga Peruana.]—*Mem. Inst. Oswaldo Cruz* 1928. Vol. 21 No 1 In Portuguese pp 161-166. With 12 figs. on 5 plates (1 coloured) In German pp. 167-172. With 12 figs. on 5 plates (1 coloured)

The authors working with a culture from a case of verruga, which they had received from Dr ARAGAO inoculated a monkey (*Pseudocebus*)

intradermally over one eyebrow and by scarification over the other and subcutaneously in the right thigh. The chief object of the research was to establish the relation between the cell-inclusions described by MEYER and ROCHA LIMA with *Bartonella bacilliformis*. In ten days time two bluish-red nodules appeared over the right eyebrow at the site of injection, and on the 16th day blood was drawn off from a vein and was examined by culture in Noguchi's medium, and also by staining, but no organisms could be seen. The temperature of the animal remained normal throughout the experiment.

On the 22nd day the monkey was killed and a careful post-mortem examination made. The heart-blood was cultured and pieces of the various organs removed for section and smear preparations were also made and stained by Giemsa's stain. The nodules and glands which drained the area were removed and embedded in paraffin for section.

In the smear preparations very numerous red cells and polynuclear cells were seen and also many large endothelial cells, and in the plasma of these were seen very numerous pale pink-staining inclusions, the smallest of them being about 1 to 1.5 μ . in diameter. In some of the endothelial cells there were large masses of this pink-stained granular substance occupying practically the whole of the plasma of the cell, and separated off from the periphery of the parent mass small bipolar stained bacillary bodies could be seen. In other cells the whole mass on careful examination could be seen to be divided up into minute bacillary forms, some of these were dumb-bell shaped. The same appearances were noted in the endothelial cells in sections cut from the nodules. So far as could be made out, there were no inclusions in the red cells.

The authors are of opinion that these inclusions are identical with those described by MACKENZIE and WEISS, as seen by them in material from a monkey which had been inoculated directly from a human case of Oroya fever and also the masses observed in the cells are in agreement with the description by STRONG and his co-workers of similar bodies in cases of Oroya fever and recognized by them as multiplication forms of *Bartonella*.

The relationship of these bodies to the Chlamydozoa is also discussed. In view of the successful treatment of splenectomized rats, in whose blood *Bartonella muris* had appeared, by arsenicals, the authors applied this method to two experimentally-infected monkeys but the drugs appeared to have no curative effect on the verruga nodules nor have these drugs been found of any avail in the treatment of human cases.

D. H.

AMOEBIASIS AND DYSENTERY

AMOEBIASIS.

DESCHIENS (R.) & MELNOTTE (P.) A propos de quelques déterminations extra intestinales de l'amibiase. [*Diagnosis of Extra-Intestinal Amoebiasis.*]—*Presse Méd.* 1928. Dec. 5 Vol. 36. No 97 pp. 1545-1546. [2 refs.] [Pasteur Inst. Paris.]

The authors declare that it is not in dispute that intestinal amoebiasis may have by direct extension or by metastasis visceral sequelae in the form of abscess of liver abscess of brain abscess of spleen and in the lung a primary abscess or one secondary to abscess of liver There are however some who seized with the hypothesis of a general amoebic disease have recorded cases of amoebic bronchitis cholecystitis nephritis cystitis urethritis—all primary or secondary inflammatory or suppurative—and even of "amibhémie. In none of these cases has there yet been presented any indubitable parasitological proof in support of these diagnoses. In fact they have been made on the insufficient grounds of finding supposed amoebae in the fresh material from the lesions and, or on the curative effects on the patients of emetine injections.

The authors follow BRUMPT in insisting that proof parasitological lies solely in the demonstration in wet fixed and selectively stained specimens of the morphological characters of the *Entamoeba dysenteriae* (COUNCILMANN and LAFLEUR 1893) and especially of its nuclear structure or even by the production of amoebic dysentery in the kitten by inoculation with the suspected material.

The entamoebic infestation index in Fez (Morocco) was found in 1922, by DEKESTER and JAUSION to be 23 per cent. DESCHIENS in 1925 examining 959 subjects found it to be 21.7 per cent. Fez therefore may be taken to be a centre of amoebic infection of the first order and in this centre MELNOTTE during five years (1923-1927) made a systematic search for visceral lesions of amoebiasis by careful examination of fresh material immediate and after keeping at 37° C.

Pulmonary 200 patients—Bronchopneumonia bronchitis pleurisy pulmonary congestion with purulent and or bloody sputa. (In 150 of the patients amoebae were found in the faeces.) Emetine had no effect on the pulmonary conditions except in 4 cases of pulmonary congestion whose sputa revealed pneumococci—in these 4 rapid amelioration of symptoms followed on emetine injections. The sputa of all 200 never revealed any amoeba free or encysted. Amoebiasis then plays no part in the aetiology of pulmonary affections in Fez.

Urinary The centrifuged deposits of 300 pathological urines in Fez revealed no free or encysted amoebae. Here the authors recall CARVAILLO's failure to infect the bladder of kittens (highly susceptible to the infection) with dysentery amoebae [this *Bulletin* Vol. 24 p. 18]

Emetine cure is not a criterion of amoebiasis. BRELET and RENON have shown that emetine had a beneficial effect on haemorrhagic and congestive conditions. RAMOND that it was curative in acute bronchitis. FLANDIN that it stopped haemorrhage in haemoptysis. ROMIEU that it has a general haemostatic and antiseptic action and GUGLIEMETTI has experimentally demonstrated its bactericidal action. Moreover LAGNOV (1928) has shown its success in non-amoebic (post pneumonic) pulmonary abscess. The authors point out that identification of *E. dysenteriae* in fresh material is difficult even for experts. Organic

inflammatory exudates often contain leucocytes and macrophages containing red blood cells and showing amoeboid movements. If not selectively stained these macrophages may be mistaken for amoebae even by trained workers. It is possible in fresh material by adding to it double iodine solution to distinguish the characters of the entamoeba nucleus—but this technique is not constantly reliable. Wet fixation and differential staining with iron-haematoxylin is indispensable.

Furthermore, *Entamoeba gingivalis* (Gros 1849) from the mouth may be found in sputa, and thus be thought to have come from bronchus or lung. Examination of material from the mouth of the patient would exclude such an error. Another possible mistake lies in the presence of intestinal or buccal flagellates. If the flagella are lost the parasite is easily taken for an amoeba—as for example "*Amoeba undulans*."

[This is an interesting and valuable and yet not long paper in which some of the now numerous and increasingly giddy records of various extra-intestinal lesions and syndromes labelled amoebiasis, are questioned by two authors well equipped for the needed task.]

H. M. Hanschell.

CORT (E. C.). Amoebiasis of the Liver.—*Jl Amer Med Assoc.* 1928 June 23. Vol. 90 No 25 pp. 2005-2006. With 3 text figs. 3 refs. McCormick Hosp. Chongmai, Siam.]

Observations on 530 cases of amoebiasis in Siam, 97 of them with hepatic involvement. 14 of these were treated by aspiration. In two cases there was rupture of liver abscess through lung. In one rupture into left pleural cavity treated by aspiration. Of the 97 cases diagnosed as amoebiasis of liver there was no definite history of previous dysentery in 18. In all 97 cases there were—pain in hepatic region tenderness and enlargement of liver. Intermittent fever. In all, injection of emetine brought about relief of symptoms and reduction of size of liver in two to four days.

The author concludes that —

1) Emetine while not a specific for amoebic infections of the intestine, certainly approaches the nature of a specific for amoebiasis of the liver.

2) Adequate emetine treatment apparently cures all cases of amoebic hepatitis and even when large abscesses are present greatly reduces the mass of the liver and converts a poor surgical risk into a good one.

3) Aspiration with preliminary and subsequent emetine treatment affords the safest methods of dealing with large abscesses and has the additional advantage of short non-absence.

H. M. H.

COSTA MANDRY (O.) & MARIN (R. A.). Algunas consideraciones sobre la amibiasis en Puerto Rico. Amoebiasis in Porto Rico. *Bol Asoc Med de Puerto Rico* 1928 Oct. Vol. 21. No 166 pp. 5-9. 8 refs. School of Trop Med Univ Porto Rico.]

Though brief this paper opens up an interesting question for research. HEGGER (1921) HILL & HILL (1927) as a result of the examination of Porto Ricans came to the conclusion that some 500,000 individuals harboured *E. histolytica*. Statistical returns of the Health

HEGGER found *E. histolytica* in 10 of 83 stools of Porto Rican natives. HILL & HILL in 3 of 1.5 stools of children. How the half-million cases is calculated does not appear.—En

Department show that very few cases of amoebic dysentery are reported and there was only one death in the year from this cause. ASHFORD in 1924 at the International Conference held in Kingston, Jamaica stated that amoebic dysentery was practically non-existent in Porto Rico. A reference to hospital records revealed only five cases among 93 000 patients.

To obtain further information a questionnaire was sent to 126 medical men and replies show that between 2 000 and 3 000 cases of diarrhoea with blood and mucus were seen by them in a year an average of about 20 cases each and altogether there had been only six cases of hepatic abscess.

The authors themselves examined the faeces of 185 cases of acute diarrhoea and found only three of amoebic dysentery. Among the questions asked at the end of the paper are 1. Is the variety of *E. histolytica* present in Porto Rico less virulent than that found elsewhere? 2. Is there a certain degree of natural immunity to the *Entamoeba* among Porto Ricans?—both points of considerable interest.

H Harold Scott

SUZZI (Dino) *Lamebiasi nella città di Bologna. [Amoebiasis in Bologna.]—Arch. Ital. Sci. Med. Colon* 1927 Dec. Vol. 8. No 12. pp. 715-728. With 1 map & 1 chart. [19 refs.] [Inst. of Trop. Path. Univ. Bologna.]

Of 59 cases of amoebic infection the author traced the residences of 44. He gives a spot map of the town and a list of the streets in which cases occurred, from which it is seen that the disease is spread fairly generally and not localized in any particular area nor confined to the poorer classes.

H Harold Scott.

i. VENABLES (John F) *Intestinal Amoebiasis in Britain. [Correspondence.]—Brit. Med. J.* 1928. Oct. 27 p. 775

ii. WILLOUGHBY (Hugh) *Intestinal Amoebiasis in Britain. [Correspondence.]—Ibid.* Nov 8 pp. 820-821

i. Reports the case of a patient with relapsing dysentery who had never been out of England, in whom after repeated failures to demonstrate amoebae by microscopical examination of stools sigmoidoscopy revealed the typical small boil lesions of amoebic ulceration. From these lesions 'encysted amoebae of the histolytica variety' were obtained. The symptoms and lesions disappeared after emetine injections. The author in 8 years had seen 3 other cases in England held to be indigenous intestinal amoebiasis. He insists on the indispensability of sigmoidoscopy in the diagnosis of dysentery.

ii. Supports practice of sigmoidoscopy. Swabbing a lesion is ineffective. Amoebae are more certainly obtained if the lesion be scraped with long-handled spoon. In treatment best results are obtained by emetine bismuth iodide by mouth combined with Yatren 2½ per cent. solution lavage per rectum.

H. M. H.

" (6) The results confirm the view that the therapeutic efficacy of emetine in human amoebic dysentery is probably due to the direct toxic action of the alkaloid upon the amoeba."

H. M. H.

MARTINDALE (W. H.) Possible Cumulative Effect of Emetine Bismuth Iodide and Emetine Periodide. [Correspondence.]—*Brit. Med. J.* 1928. Dec. 1 pp. 1010-1011

Calls attention to possibility of a cumulative effect from either emetine bismuth iodide or emetine periodide. The use of both E.B.I. and E.P.I. in amoebic dysentery carriers has been extensive and it has been emphasized that large quantities of E.B.I. are essential total doses of 30 to 40 grains, in daily doses of 3 to 4 grains. In schistosomiasis in children the dose should be carefully reduced in proportion to age and precaution against accumulation taken not only by watching general condition of patient, but also by examining urine with an alkaloidal reagent to see that proper elimination is proceeding.

H. M. H.

PELLE (A.) & LE BARON Ambiasie pulmonaire traitée par le pneumothorax et l'émétine. [Pulmonary Amoebiasis treated by Pneumothorax and Emetine.]—*Bull. et Mém. Soc. Méd. Hôp. de Paris.* 1929 Feb 18 Year 45. 3rd. Ser No 5. pp. 234-237

The authors exordium is that pulmonary amoebiasis will be considered less rare when the habit of thinking of it develops. They describe a case of pulmonary abscess in a male 25 years old, who four years before had had malaria. Eventually characteristic amoebae were found in the chocolate coloured, bloody foetid sputa—and later amoebic cysts in the stools. The liver was normal. Recovery followed treatment by emetine injections, novarsenobenzol and artificial pneumothorax. After two injections of emetine, the patient's sputa failed to infect a kitten with amoebiasis.

[One day this thinking of primary pulmonary amoebiasis may perhaps even lead to the attempt to demonstrate amoebae in the sputa by the method by which alone they can be demonstrated to be amoebae—wet fixation and differential staining.]

H. M. H.

BETHEA (Oscar W.) Specific Treatment of Amoebic Dysentery—*Jl Amer Med Assoc.* 1929 Jan 26. Vol. 92. No. 4 pp. 310-311

The author's experience in treating acute and chronic amoebic dysentery in New Orleans has led him to the adoption of a standard specific treatment—varied of course on occasion to suit the patient when necessary. It is as follows—

First period—five days. One grain (0.065 gram) of emetine hydrochlor daily intramuscularly. No other medication and unless contra-indicated, the patient is put on full typhoid diet.

Second period—ten days. Emetine injections continued as above and in addition one of the following: 10 phenyl salicylate coated, 5 grain (0.3 gm.) ipecac. pills each night at bed time or two tablets of acetar some [actual dose not stated] each morning on awakening or two or three pills of an organic iodine preparation (Iodo-oxybenzopyridine

sulphonate) [actual dose not stated] three times a day. If the ipecac. pills are given at bed time the patient is given soft diet up to 1 p.m. and from then nothing but water tea or coffee bouillon ginger ale. If the acetarsone is given in the mornings no food is allowed for four hours except the liquids above mentioned. During this second ten day period the patient is given a daily colon irrigation of 90 grains (2 gm) of quinine sulphate in one half gallon of warm water. The typhoid diet is continued.

Third period—three months. One day each week a full treatment is given as directed in the second period above.

[The author has not overlooked toxic effects. He has had two cases developing general toxic neuritis characterized by motor incapacity in arms and legs. He curiously enough attributes this to the ipecac. only—and apparently here forgets the emetine hydrochloride. Also he had seen two rather violent reactions from acetarsone taking the form of a marked gastro-intestinal disturbance with morbilliform rash. Both patients recovered in 7 days. It is to be noted that he advocates the dangerous practice of giving acetarsone to fasting patients.]

H. M. H.

LEMAIRE (E) A propos du traitement de la dysenterie amibienne chronique [Treatment of Chronic Amoebic Dysentery]—*Rev Méd et Hyg Trop* 1928 Sept.-Oct Vol 20 No 5 pp 145-146 [1 ref]

A sous-officier of colonial infantry had suffered for ten years from frequent relapses of amoebic dysentery. Active dysentery amoebae could be demonstrated in the mucosanguineous stools. He had had several hundred emetine injections and various arsenobenzol preparations by mouth. He had found most relief from emetine injections combined with stovarsol by mouth. On the occurrence of a relapse the author treated him by giving every other day by mouth three tablets each containing 0.25 gram stovarsol and on the intervening day five cubes in coffee of Ravaut's paste (composed of powdered charcoal bismuth subnitrate powder syrup glycerine—of each 100 grammes and powdered ipecac 4 grams). Improvement in the patient's condition was immediate and striking. He soon could forget he was a dysenteric. The author does not claim a complete cure. He expects relapses but points out the simplicity and ease of this treatment which does not require hospitalization.

H. M. H.

SAUJON (M) Troubles uro-génitaux guéris par l'émétine Origine amibienne vraisemblable [Uro-genital Symptoms probably Amoebic cured by Emetine]—*Bull Soc Path Exot* 1928 Dec 12 Vol. 21 No 10 pp 883-884

A woman 24 years of age suffered from frequency of micturition and vulval discharge. She had had an attack of dysentery. Examination of stool revealed numerous ascaris ova but no amoebae. An intact hymen prevented vaginal or uterine examination, but the mucosanguineous discharge from vagina revealed rounded immotile amoebae containing red blood corpuscles. In some slight pseudopodic movements were noted. Clinical cure followed on emetine injections and later stovarsol by mouth.

H. M. H.

VIALARD La méthode de Whipple comme thérapeutique adjuvante dans le traitement de l'hépatite aiguë amibienne. [Whipple's Method as Adjuvant in Treatment of Amoebic Hepatitis].—*Bull et Mém. Soc. Méd. Hôp. de Paris* 1929 Feb 11 Year 45 3rd Ser No. 4. pp 207-208

Case I. Four years previously dysentery in Halphong. He had large tender liver. Irregular fever slight thoracic pain, anaemia. No amoebae or cysts found in stools. Apparent cure after emetine injections and a thick liver soup by mouth and later treparol by mouth.

Case II. Many previous attacks of malaria, and relapses of amoebic dysentery. Large tender liver. Icterus anaemia. No amoebae or cysts found in stools. Apparent cure followed emetine injections and a diet of calf's liver. In both cases a rapid mount of the red blood cell count to normal followed on the liver diet.

H. M. H.

LANTEN (Pedro T.) Yatren 103 in Amoebic Dysentery.—*Philippine Islands Med Assoc* 1928 Apr Vol. 8 No. 4 pp. 178-181. [3 reis] [College of Med. Univ. of the Philippines, & Clinics of the Philippine Gen. Hosp. Manila, P.I.]

Twenty-six cases of amoebic dysentery acute and chronic, responded very favourably to yatren treatment, as demonstrated by faecal examinations during and after administration of the drug. Marked improvement of clinical symptoms occurred at same time as disappearance of trophozoites and cysts from stools. A large amount of the drug by mouth was required to obtain improvement of long duration.

H. M. H.

MOXTEL (M. L. R.) Sur un cas de dysenterie amibienne récidivante traité par le "Yatren." [Case of Relapsing Amoebic Dysentery treated with Yatren].—*Bull Soc. Path. Exot.* 1928, May 9 Vol. 21 No. 5 pp 367-368.

The patient, aged 47 years, had suffered off and on for 15 years from amoebic dysentery. Many stool examinations had demonstrated free and encysted *E. histolytica*. He had been treated with emetine in 1913-1914 and since then with arsenicals such as stovarsol and treparol, and with samaruba, as well as E.B.L.—all repeatedly. He was put to bed and given by mouth daily 3 grammes of yatren for 10 days, repeated after 10 days rest. Three such courses in all. After the first course the stools became formed. After the third the stools revealed no cysts and no free amoebae. The patient has kept well.

H. M. H.

VALLARINO (Joaquin J.) Report of Further Observations on the Value of Roentgen Rays in estimating the Extent of Amoebic Infection of the Large Intestine.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928, Nov. 25. Vol. 22 No. 3. pp 209-214. With 11 figs. on 6 plates.

The only summary of any real value of this interesting paper would be a reproduction of the clear skiagrams by means of which the author definitely and unmistakably illustrated various lesions of the colon in proved cases of intestinal amoebiasis. He began his observations in 1920, and gave a first report of them in 1923. He emphasizes that the final diagnosis must be made by clinician and protozoologist by examination of faeces, but he has nevertheless demonstrated that patients showing certain radiographical signs in the large intestine must needs

have their stools examined in the laboratory and repeatedly examined for amoebae. Radiography may be shown, assist the physician by showing the extent and severity of the amoebic lesions and their disappearance or otherwise under treatment. The defects in the colon shown radiographically are—slight changes such as may be caused by a thickening of the mucosa, or more definite lesions due to erosions or ulcerations which may even take the aspect of gross filling defects or there may be a smoothing of the bowel wall giving it the 'lead pipe' appearance or again a stricture-like defect caused by an old ulceration or a scar.

H. M. H.

REES (Charles W.) *Pathogenesis of Intestinal Amebiasis in Kittens.*—*Arch. Pathology* 1929 Jan Vol. 7 No 1 pp 1-26 With 10 figs. [29 refs.]

A record of an interesting series of experimental observations well illustrated by camera lucida drawings of the lesions undertaken to ascertain the methods employed by *Entamoeba histolytica* in its attacks on the colon tissue in kittens. The amoebae were cultured (BOECK and DRBOHLAV). The kittens were infected by injection of material through wall of ligated colon following laparotomy and by rectal injection without closing of anus. 84 kittens were used and from 58 of these data of value to the problem were obtained. Prepared slides of sections through amoebic lesions were studied from fourteen kittens infected after laparotomy and from eight infected by rectal injection.

Amoebic lesions could not be found in kittens that were proved infected after laparotomy when killed in less than forty hours after the operation but after ninety hours there was found destruction of mucosa and investment of colon by a diphtheric membrane. When the amoebae did not succeed in establishing themselves after laparotomy the mucosa was normal up to ninety hours.

With aid of binocular microscope minute lesions could be detected in a freshly fixed colon. (Entire colons were often sectionized in an effort to find all the lesions.) The first ulcers detectable after laparotomy usually occurred near the ileocaecal valve and the lesions were always most severe in this region after rectal injection. In kittens killed four to thirty four days after injection of trophozoites through the anus, there were often well developed ulcers and also minute lesions but the submucosa appeared not to be invaded in any case. Infection followed much more frequently when faeces from an infected kitten were injected than when amoebae in culture were used. The earliest observed symptom of intestinal amoebiasis was diarrhoea which occurred at the close of the prepatent* period (two to five days). Evidences of anatomical alterations in the colon following diarrhoea were found to consist in enlarged glands and pronounced goblet cells.

Ulcers in the colon were studied under the binocular microscope in Locke's solution while the tissue was still living. They appeared as hyperaemic areas. Tissue teased from these lesions was found under higher magnification, to contain living active amoebae—suggesting active tissue invaders. In one colon invasion by amoebae of a solitary lymph gland was noted (illustrated).

* The prepatent period extends from the time the infective parasites enter the body of the host until their offspring can be recovered by specified laboratory methods.

Study of the lesions in this work, does not support view that initial attack of the amoebae on the mucosa begins within the crypts leading to occlusion of latter and development of abscesses.

In all the material studied from kittens infected in both ways (see above) the amoebae appear to have begun the attack on the mucosa that is outside the crypts. Ulcers appeared to develop by necrosis beginning at the surface. The amoebic attack provoked a host reaction by hypersecretion of mucus and by hyperaemia. Other evidence of inflammation was manifest, but the part played by bacteria in this reaction could not be ascertained. There was no evidence that this host reaction injured the amoebae.

In many of the lesions the amoebae were not in immediate contact with the cells but separated by a zone of necrosis. This suggests their ability to inflict injury by means of toxins but the general occurrence of bacteria in the lesions complicated the problem because they may cause much of the necrosis that one could otherwise definitely attribute to the amoebae.

H. M. H.

TANABE (Mitsuo) & CHIBA (Eiichi). A New Culture Medium for *Entamoeba histolytica*.—*Acta Med. in Kiyo* 1928. Vol. 11 No. 3 pp. 63-66 (221-224) [5 refs.] [Med. Faculty Keijo Imperial Univ. Chosen Japan]

This medium is prepared as follows—in the authors' own words—

Agar slants are made with Ringer's solution 1 000 cc., agar 10 grs. and asparagin 1 gr. according to the ordinary method. These slants are covered to the depth of agar with Ringer's solution containing rabbit serum in proportion of 8 per cent. Before inoculation, two or three loop-fuls of rice starch which was sterilized at 160-180° C (dry heat) for about one hour are added to the fluid portion of the medium.

They state that the asparagin is absolutely necessary and 0.1 per cent. of it gives the best results, and that in their medium the amoebae grew luxuriantly persisting for 12-14 days—in this medium bacteria do not grow well and putrefactive odour never occurred. A second day culture of strain No. 1 of *E. histolytica* from a human acute dysentery patient was inoculated per anum into two kittens. Careful examination of the kittens' excreta on successive days revealed no vegetative or encysted amoebae. The two kittens died of pneumonia on 13th and 15th day respectively. The intestines and livers were carefully searched macro- and microscopically but no amoebae nor any pathological areas were found.

H. M. H.

LE BOURDELLÈS (B.) LINGBOIS (R.) & OLLIVIER (M.). Essais de culture de l'amibe dysentérique. [Cultivation of *E. histolytica*.]—*C.R. Soc. Biol.* 1928. June 8 Vol. 99 No. 19 pp. 78-81 [School of Military Health Service Lyons.]

The authors briefly describe and discuss their observations with various media. Excellent results were obtained when a pinch of sterilized rice starch was added to the medium, thus confirming observations of BRUMPT, SAUTET, DONELL and LAIDLAW.

They note the rarity of encysted forms in cultures in marked contrast to their abundance in the human gut. Since cysts appear when symptoms disappear they suppose that encystment in human gut is in response to an antigen-antibody reaction

H. M. H.

SAUTET (Jacques) Quelques remarques sur les cultures d *Entamoeba dysenteriae* [Remarks on the Cultivation of *E. dysenteriae*].—*Ann. Parasit. Humaine et Comparée* 1929 Jan 1 Vol. 7 No 1 pp. 64-79 [83 refs.] [Parasit. Lab. Faculty of Med. Paris.]

The author briefly reviews and comments on the attempts by various workers to cultivate *Entamoeba dysenteriae* before 1924. To BARRET and SMITH (1924) belongs the distinction of being the first to cultivate an amoeba pathogenic for the tortoise. Their work was confirmed and completed by TALIAFERRO and FISHER. In 1924 BOECK and DRBOHLAV gave us a sure technique for the cultivation of *Entamoeba dysenteriae*. The author reviews their work and then that of BRUMPT (1926) KOFOID and WAGNER (1926) JOHN YORKE and ADAMS (1926) CRAIG (1926) DOBELL and LAIDLAW (1926) and finally later work by DOBELL, DESCHIENS, VOGEL, BRUG, WAGNER, DOBELL, LAIDLAW and BISHOP. [All of these papers have received notice in this *Bulletin*.]

H. M. H.

BOURRIAU (P) Une épidémie de dysenterie amibienne à l'Asile Départemental de Lafond (Charente Inférieure) et assainissement de l'Asile [Epidemic of Amoebic Dysentery in a French Asylum].—*Mouvement Sanitaire* 1928 June 30 Year 5 Vol. 4 No 50 pp 352-365 With 1 chart in text. [4 refs.]

One hundred and eight cases of dysentery—28 deaths. They occurred in an asylum. Chlorination of water supply brought the epidemic to an end. [Although the dysentery is labelled amoebic, the author records in this paper no evidence whatever why it should have been so labelled and an asylum dysentery epidemic has yet to be proved amoebic.]

H. M. H.

DE MELLO (Froilano) & DA CRUZ (L. J. C) Résultats du traitement expérimental de divers états d'amibiase intestinale par le *Yatren purissimum* [Treatment of Intestinal Amoebiasis by Yatren].—*Bull. Soc. Path. Exot.* 1928 Dec 12 Vol 21 No 10 pp 842-845 [School of Med. Nova Goa.]

A brief resumé of observations previously published in *Arquivos da Escola Médica Cirúrgica de Nova Goa*.

They conclude that Yatren purissimum is an effective and safe remedy for acute, subacute and chronic amoebic dysentery in infants.

H. M. H.

NIÑO (Flavio L.) Síndrome disintérico por asociación amebiano tricomonal [Dysenteric Symptoms with Presence of *Entamoeba histolytica* and *Trichomonas hominis*].—*Semana Méd.* 1928 Nov 8 Vol. 35 No 45 (1817) pp 1280-1282. With 1 text fig.

A case recorded with the object of testifying further to the success of Yatren 105. The patient, a man of 30 years, had suffered with dysenteric symptoms for 5 years, passing 12-13 stools a day with blood and mucus.

After three courses of yatren he has remained free from symptoms for two years.

H. Harold Scott.

FANELLI (Giorgio) Pseudoappendicite da amœba. [Amœbio Pseudo-Appendicitis.]—*Policlínico* Ser. Prat. 1929 Jan. 14 Vol. 30 No 2 p 52.

A girl of 20 years with colicky pains in the abdomen and acute tenderness over McBurney's point and signs of appendicitis. *Entamoeba histolytica* was found in the stools and the condition was cleared up by the use of emetine without operation. [Why "pseudo"-appendicitis?]

H. Harold Scott.

CARTER (M. R.) GREENWAY (D.) URDANIZ (M.) & GREENWAY (D. F.). "Un caso de bronco-amebiasis asociada a *Treponema bronchiali* (Castellani)" (Con presentación de preparados) [Amœbio Bronchitis with *Treponema bronchiale* (Castellani)]—*Arch. Argent. Enferm. Aparato Digest. y Vetric.* Buenos Aires. 1929 Vol. 4 No 3. pp 367-374 With 5 figs. on 3 plates (1 coloured) [* reb]

A girl of 16 years with cough and bloodstained sputum. In this were found vegetative forms of *E. histolytica* and *Treponemata*. The faeces also contained the former. There was no sign of hepatic or pulmonary abscess.

H. Harold Scott.

BACILLARY DYSENTERY

McGRATH (M. J.). A Description of the Steps taken in a Mental Hospital to prevent the Spread of Dysentery and Allied Infection Diseases.—*Jl Mental Sci.* 1928. Oct. Vol. 74. No. 307 pp 720-726.

The author emphasizes that an institution free from dysentery is peculiarly susceptible to infection, particularly by a foreign strain from other institutions. Investigations give support to the view that periodic immunization of institutions is continually taking place where preventive measures are not in force. He regards all batches of transfers from other institutions with the greatest suspicion, even though the institutions have a clean bill of health and each individual in the batch is certified to be free from dysentery and enteric. The batches must be detained in a special receiving ward until each individual's examination for infectivity is completed. In combating "asylum dysentery" the first essential is the provision of isolation wards so arranged that the patients in such ward come into contact, even when exercising in the open with patients from no other ward. Their laundry and food must be likewise truly isolated, and their attendants be adequately trained to recognize the importance of this disease and the means of preventing its spread, and especially to note themselves (not wait for the patient to report it) the first beginning of diarrhoea in the patient. The blood and faeces of each patient must be examined directly after admission, and the positive ones be isolated. Probationer nurses on joining must also be so examined. The author's figures for five years showed that out of 467 probationers 83 had to be rejected for dysentery or typhoid—the probationary staff therefore provide a source of infection quite as formidable as the new patients. The foundation of the whole scheme is the bacteriological examination and a close association must be maintained between clinician and bacteriologist. The dysentery carrier, experience has shown, must submit to permanent isolation.

H. M. H.

HOWDEN (A. L.) *The Bacteriological Examination of Faeces for the Isolation and Identification of the Dysentery and Typhoid Group of Organisms.*—*Jl Mental Sci* 1928. Oct. Vol. 74 No. 307 pp 727-732.

Faeces sent to the laboratory are plated direct on to three previously dried Rebigel agar plates the plates are incubated at 37° C. for 18-24 hours. On this medium *Bact coli* produces large red colonies while those of dysentery and typhoid groups are small and clear. The subcultures and inoculations into sugars are described as is also the technique of blood culture. Widal tests and the method of obtaining blood from the patient. They are all according to well known standard methods.

H. M. H.

SASAKI (R.) [Types of Dysentery Bacilli in Kyoto.]—*Oriental Jl Dis Infants* 1928. Sept. Vol. 4 No. 2. [In Japanese. English summary p. 4.] [*Pediat. Clinic Imperial Univ Kyoto*]

One hundred and twenty-eight cases were investigated, of which 72 were pure dysentery 22 fulminating dysentery and 34 enteritis. Dysentery bacilli were isolated in 30 cases of the first four cases of the second and two cases of the third type. The most prevalent form of dysentery organism was the Oga type fermenting dextrin maltose dextrose and mannite and seemingly peculiar to Kyoto. Next in frequency came Y and Flexner types while Shiga and paradyentery were seldom found.

W. F. Harvey

CERRUTI (Carlo F.) *Bacilli metadysenterici (Castellani) e B coli anaerogenes (Lembke)* [*Metadysentery Bacilli and Bact. coli anaerogenes*].—*Ann di Med Nav e Colon* 1928. Sept.-Oct. Year 34 Vol. 2 No. 3-4 pp 153-172. With 1 chart. [31 refs.] [*Hyg Inst. Univ Turin*]

The author prefaces his work with remarks on the similarity existing between the organisms known as *Bact coli anaerogenes* of LEMBKE the pseudodysentery race E of KRUSE paradyentery group III of SONNE and the metadysentery bacilli of CASTELLANI. His own work consists mainly of comparison of metadysentery bacilli with LEMBKE's organism in respect of morphological and cultural characters final hydrogen ion concentration in glucose lactose- and mannite-peptone water pathogenicity cross agglutination and absorption tests. He considers that LEMBKE's organism is a separate species because the other organisms (1) have been isolated from dysentery or dysentery like cases while it has been isolated from the dog healthy individuals and by himself from well water (2) ferment sugars more slowly coagulate milk more slowly and do not produce in culture the same final hydrogen ion concentration (3) never produce gas in their fermentation of sugars while it can produce a little after repeated subculture.

The anaerogenes colon group may be regarded as intermediate between colon bacilli and the metadysentery bacilli.

W. F. Harvey

HOSHI (Naotoshi). [On Child Dysentery in Manchuria, especially on the Bacillus Types and Blood-Findings].—*Jl Oriental Med.* 1929. Jan. Vol. 10. No. 1 [In Japanese. English summary pp. 1-9 40 refs.] [Dept. of Pediat. General Hosp. Dairen.]

Very various methods have been adopted for the typing of dysentery organisms such as mannite fermentation, toxicity towards rabbits, indol production, carbohydrate fermentation, agglutination, etc. The author has investigated the type of dysentery organism occurring in 800 cases of dysentery like diseases in children. By the use of the agglutination test five types were obtained and the original Shiga type occurred in only 12 per cent of the 241 organisms isolated. With the carbohydrate method of typing 1 organisms had the largest percentage frequency (46.3) after which came in serial order Flexner (23.8), Shiga original type (12.2), Hiss II (5.5) and Strong types (4.3). Most of the children examined were under 3 years of age. The original Shiga type was found more frequently than the other types in children over 7 years and it is this type also which gives the largest mortality. Blood changes were represented by a neutrophilic leucocytosis and decrease or disappearance of eosinophiles.

W. F. Harvey

LEUCHS (J.) & PROCHMAN (E.). Ueber Ruhrbazillen vom Typus E (Kruze) [Dysentery Bacilli of Type E (Kruze)].—*Cent. f. Bakt.* I Abt. Orig. 1928. Dec. 4. Vol. 109. No. 7-8. pp. 398-408. [12 refs.]

The authors have already published work (see this Bulletin Vol. 25 p. 231) relating to the two forms of colony which they obtained with their strains of type E (Kruze) dysentery organisms. These forms are spherical (g type) and flat (fl. type) respectively. In the present research they find that these two types show marked differences in behaviour to agglutinating sera in complement fixation in lethality to mice and in susceptibility to a bacteriophage obtained from coli and paratyphoid B organisms. The g forms were the more virulent and more resistant and g-sera agglutinated both g and fl. types but in different degree while fl-sera agglutinated only fl. types.

W. F. Harvey

LARGE (W. T. H.). Notes on Sonne Dysentery in Lahore District.—*Jl Roy Army Med Corps* 1929. Jan. Vol. 52. No. 1 pp. 1-6. [8 refs.]

When first isolated it was difficult to detect any difference of type among the colonies. After 10 to 12 subcultures two types A and B could be separated. (1) A the rarer resembling the Sonne bacillus in all particulars, with crenated irregularly circular colonies, depositing in broth and agglutinating to full titre with Sonne serum and (2) B, the commoner closely resembling a Flexner colony with smooth-edged, circular colonies, not depositing in broth and not agglutinating with Sonne serum. Both types ferment lactose the A type usually in broth by the 3rd day the B type by the 5th day. When kept for some time, the B type shows dissociation into colonies of the A or Sonne group III type and of the differing B type. The B type of colony

is the more common and the A type is easily missed. A type B serum is obviously necessary for identification purposes as well as the type A or true Sonne serum.

W F Harvey

LOMMEL (Jeanne) *Bacillus dysenteriae* Some Observations on a California Strain.—*California & Western Med* 1928. Nov Vol. 29 No 5 p 332 [9 refs.] [Med. School Univ of California, San Francisco]

An organism has been isolated from a child suffering from mild diarrhoea with blood and mucus in the stool which proves to be a member of the Sonne group. It is indol negative coagulates milk after 3 days forms acid but no gas in glucose levulose mannite l arabinose galactose mannose and maltose and fails to ferment even after 3 weeks incubation lactose saccharose dulcitol adonitol inositol mulin salicin and xylose. The antiserum to this organism agglutinates it to a limit of 1 in 4 000 and a standard strain of the Sonne bacillus to 1 in 2 000 while Sonne serum of titre 1 in 4 000 agglutinates it equally to this titre. The strain is not agglutinated by Shiga, Flexner or polyvalent dysentery sera.

W F Harvey

BRAUN (H.) & WEIL (A. J.) Ueber den Ruhrbazillus Kruse-Sonne. [The Kruse-Sonne Bacillus].—*Cent f Bakt* I. Abt Orig 1928. Oct. 26 Vol. 109 No 1-4 pp. 16-30 With 5 text figs [47 refs.] [Municipal Hyg Inst. Univ. Frankfurt a.M.]

The authors point out the identity of the SONNE bacillus with race E of KRUSE's pseudodysentery bacilli. They enter in detail into the cultural and serological characters of this bacillus which they maintain is entitled to rank as a true bacterial species and they propose to call it the Kruse Sonne dysentery bacillus.

W F Harvey

ROBIC (J.) Une épidémie de dysenterie bacillaire à Madagascar (1927-1928) [Epidemic of Bacillary Dysentery in Madagascar].—*Bull Soc. Path. Exot* 1928. Oct 10 Vol. 21 No 8. pp 709-713 [1 ref.] [Pasteur Inst. Tananarive Madagascar]

The author has demonstrated that a severe epidemic of dysentery in 1928 was bacillary in nature. Clinically the cases presented no unusual features. No amoebae could be found in the fresh mucosanguineous stools repeatedly examined the microscopic fields crowded with white corpuscles and red blood cells were characteristic of bacillary dysentery. In fact a Shiga bacillus was isolated and its nature confirmed by agglutination tests and rabbit inoculations. Later a Flexner type was also isolated. The author noted that hitherto the dysentery of Madagascar had been taken as amoebic.

H. M. H.

KERRIN (J. C.) & GILL (J. M.) Flexner Dysentery in a Two-Day-Old Child. [Memoranda].—*Brit Med J* 1929 Jan. 5 p 16

A 48 hours old male infant passed two or three daily loose green mucosanguineous stools. No fever. From these stools a bacillus culturally

identical with *Bact. dysenteriae* Flexner was isolated. It was agglutinated to full titre with a polyvalent Flexner agglutinating serum. From a rectal swab from the mother an identical organism was isolated.

H. M. H.

VAN DEN BERGH (V. H.) Bijdrage tot de kennis van de biochemie der Dysenterie-Bacteriën. [Biochemistry of the Dysentery Organisms.] — *Nederl. Tijdschr. v. Hyg. Microbiol. en Serol.* 1928. Vol. 2 No. 4 pp. 249-255 [18 refs.] [Pharmaceut. Lab. Utrecht.]

A considerable amount of biochemical work has been done with *Bact. coli* organisms and comparatively little with typhoid and dysentery bacilli. Gaseous products when formed, are invariably carbon dioxide and hydrogen. In this research it is the mixture of acids from fermentation of carbohydrate by dysentery organisms which has been the special object of investigation. The divergence of its chemical activity taken with the fact of its non-motility and non-possession of catalase leads the author to consider that *Bact. dysenteriae* Shiga-Kruse lies outside the group of the typho-coli organisms although allied to it and that the pseudo-dysentery bacilli (Flexner-Hiss) can be regarded as transition forms. Among the differential characters in the typho-coli-dysentery group which are emphasized in the concluding summary are —

1. These organisms grow better under aerobic conditions, but *Bact. coli* is a much more facultative organism than the others.

2. *Bact. typhosum* and *Bact. dysenteriae* Shiga-Kruse show much less luxuriant growth than the other organisms. This characteristic also manifest in regard to sulphite fermentation, the fermentation of pyruvic acid, the sulphite fermentation of pyruvic acid and the fermentation of sod. formate.

3. Fermentation by *Bact. coli* the paratyphoid and typhoid organisms results in the production of formic, acetic, succinic and lactic acids, whereas *Bact. dysenteriae* Shiga-Kruse produces no lactic acid, but abundant acetic acid.

W. F. Harvey

DOORENBOS (W.) Over de bereiding van Dysenterie-Bacteriophage voor therapeutisch gebruik. [Preparation of Dysentery Bacteriophage for Therapeutic Use.] — *Nederl. Tijdschr. v. Hyg., Microbiol. en Serol.* 1927. Vol. 2 No. 2 pp. 139-148. With 2 text figs. [6 refs.] [Lab. Quarantine Council of Egypt, Port Tewfik.]

1. *Bouillon.* The medium used in preparation is the ordinary bouillon of the laboratory containing 1 per cent. peptone and 0.5 per cent. salt, with reaction pH 7.8 to 8.

2. *Bacterial suspension.* Two standard loopfuls of each of the several strains used are transferred from an 18-hr. agar culture to flasks containing 200 cc. bouillon, to give a light suspension which must be completely lysed.

3. *Bacteriophage.* The bacteriophage used is a mixture of 7 strains of extreme virulence that is to say each strain must be capable of completely lysing a suspension containing 250 million organisms per cc. One drop is added to each bouillon suspension of organisms and the flasks kept at 37° C. for 10 to 12 hrs. Shiga bacilli are completely lysed in 4 hrs., Flexner and Hiss in 5 to 6 hrs.

Lysis is complete and permanent, but the lysate nevertheless, is filtered through a Chamberland candle L3 for the removal of any resistant bacilli. The lysates of all the flasks are mixed before filtration. Amplexes are filled with lysate in quantities of 2 to 3 cc.

For use the contents of one ampoule are mixed with half a glass of ordinary water and drunk off. A second dose is taken 12 hours later and if necessary a third dose after another 12 hours. No contra indications exist to the administration of bacteriophage in bacillary dysentery and the earlier the better. If ampoules are kept in a cool place the bacteriophage will preserve its virulence for years. Should the contents of an ampoule become turbid it must not be used. Convalescence should set in within 24 hours of administration. Bacteriophage can also be used prophylactically and a dose of 2 cc. every 3 days confers complete immunity for as long as it is continued.

W F Harvey

MATSUMOTO (Kaoru) & SEKI (Takashi) *Immunological Studies of the Constituents of Bacillus dysenteriae (Shiga)* — *Japan Jl Experim Med* 1928. Nov 10 Vol 7 No 1 pp 1-7 [5 refs.]

A considerable amount of work has been done to show that bacteria consist of nucleoprotein which is antigenic both *in vitro* and *in vivo* and species-specific, and of residue or soluble specific substance said to be a complex carbohydrate which is not antigenic *in vitro* but is type-specific *in vitro*. Shiga dysentery bacilli also consist of the same two types of substance. The nucleoprotein is found to be toxic and the residue substance non toxic. Rabbits were immunized with whole bacteria with nucleoprotein and with residue. Agglutinin formation showed itself highest with whole bacteria, next with nucleoprotein and least with residue. The purer the residue the less the agglutinin that was developed. Tests carried out on mice showed that anti-bacterial serum had the greatest protective power that antinucleoprotein serum came next and that antiresidue serum was inefficacious.

W F Harvey

PONOMAREW (A. W.) [Sur quelques conditions de l'action sur l'organisme des sérums antidiphthérique et antidysentérique.] [*Some Conditions of Action of Antidiphtheritic and Antidysenteric Sera.*]—*Arch Sci. Biol* 1928. Vol. 28 No 4 pp. 463-470 [14 refs.] [In Russian. French summary pp 501-502.]

The argument, on which is based the contention of the author that before antisera can act in neutralizing toxins affecting the central nervous system a barrier to their circulation has to be overcome is provided by the experiment that after a rapid succession of compressions and decompressions of the brain antidiphtheritic serum will appear in the cerebrospinal fluid but will not appear without this preliminary operation. In animals in which this barrier has been broken down, antidiphtheritic serum injected into the ear vein will neutralize toxin that has been injected into the other ear vein 45 to 60 minutes previously or at least greatly delay death whereas control animals with barrier intact die in 2, 3 or 4 days. Even animals with declared symptoms could be saved. Similar experiments were successfully carried out with antidysenteric serum.

W F Harvey

TREVAN (J W) A Statistical Note on the Testing of Anti-Dysentery Sera.—*Jl. Path. & Bact.* 1929. Jan. Vol. 32. No. 1 pp. 127-134 With 4 graphs in text. [2 refs.] [Wellcome Physiol. Research Labs. Beckenham Kent.]

Greater accuracy in the determination of the L+ dose of serum is obtainable the less the amount of toxoid present in the toxin, the larger the number of lethal doses used and the steeper the toxin mortality curve. A high degree of accuracy has been obtained in the case of diphtheria toxin and serum titration but "the individual L+ doses of antidyentery serum for mice vary over a comparatively wide range." This statistical note is summarized by the author as follows—

1. Methods of evaluating the error of determination in toxicity determination are described and applied to the estimation of the potency of anti-dysentery serum.

2. The error of estimation of the potency of Shiga anti-dysentery serum by the method recommended by the League of Nations Health Committee is calculated. If 40 animals be injected half with a standard serum and half with an unknown serum, the potency of the known serum in terms of the standard will be not less than 70 per cent. and not more than 140 per cent. of the true value in 95 per cent. of such tests.

3. The use of multiple test doses of toxin as described by BLAKE and OKELL is shown to diminish the limits of error to 88 per cent. and 112 per cent. of the true value for the same number of animals.

W F Harvey

BLAKE (Adelaide V) & OKELL (C C) Standardisation of Anti-Dysentery Serum. Effect of Increased Test Dose of Toxin on the Accuracy of Titration.—*Jl. Path. & Bact.* 1929. Jan. Vol. 32. No. 1 pp. 121-126 With 1 graph in text. [3 refs.] [Wellcome Physiol. Research Labs. Beckenham Kent.]

The titration of antidyenteric sera has not yet attained the accuracy of methods used for antidiphtheritic and antitetanic sera. This is partly due to wide variation in susceptibility of individual mice and partly to difficulty in obtaining a toxin sufficiently concentrated or in a physical state suitable for intravenous injection. It has been shown, likewise, that the substitution of rabbits for mice does not diminish the variability in results of titration. The varying susceptibility of mice is shown by the results obtained with a Shiga toxin consisting of dried bacillary bodies which, for doses of 0.02, 0.01, 0.005 and 0.0025 mgm. gave percentage mortalities of 100, 80, 45 and 30 per cent. respectively. The experiments of the authors have shown that there is no need to restrict the test dose to the small amount suggested. Five times that dose may be used and with considerable improvement in accuracy. A further objection to the use of bacillary body toxin is that, in saline suspension, it is not capable of diffusing easily throughout the suspending fluid. A toxin has been prepared, which gets over this difficulty by adding 40 per cent. solid ammon. sulphate to a filtrate of a 14-day Shiga culture and drying the precipitate. The stability of the toxin has so far proved satisfactory. Whereas, with the League of Nations test dose a 33 per cent. drop in survival rate of mice corresponds with a 34 per cent. drop in antiserum potency, the same survival rate has represented, when 5 times that dose was used, a 19 per cent. drop in serum potency. The toxin prepared by precipitation with ammon.

sulphate was used in dose equal to 2½ times the League dose and in this case a 33 per cent survival rate represented a drop of 8.5 per cent. in serum potency. These show approximation in accuracy to antidiphtheritic and antitetanic serum titrations.

W F Harvey

HOSOYA (S) & STÉFANOPOULO (G J) Etude sur la nature et la purification de la toxine dysentérique. [*Nature and Purification of Dysentery Toxin.*—*C R Soc Biol* 1928. Vol. 99 No 38. pp 1911-1914 [1 ref]

The method used is the same as that described already in conjunction with MIYATA (*C R Soc Biol* 1928 Vol 99 pp. 773 1297 & 1465) for tetanus diphtheria and botulinus toxins. The preparation from agar cultures is as follows —

(1) Heat a thick suspension of the growth from 48-hr cultures in distilled water (12 Roux bottles in 200 cc.) for 1 hour at 58° C (2) Leave at laboratory temperature for 24 hours (3) Add a solution of caustic soda until the mixture attains an alkalinity of N 100 (4) Shake from time to time for some hours (5) Filter through infusorial earth (6) Add 2 per cent. zinc chloride to the viscous filtrate until precipitation is complete (7) Filter through paper (8) Wash the precipitate on the filter paper several times with distilled water (9) Suspend the precipitate in a little water and redissolve it by the addition, drop by drop of neutral ammonium sulphate (10) Add ammonium sulphide to get rid of the zinc (11) Neutralize the liquid by acetic acid and dialyse in running water for 24 hours

The liquid remaining in the dialyser is the purified toxin and gives the biuret reaction. A rabbit receiving 1 cc. of this purified toxin intravenously shows paralysis a profuse diarrhoea on the 4th day and dies on the 5th day

W F Harvey

HOSOYA (S) & STÉFANOPOULO (G J) Toxine dysentérique purifiée abiurétique. [*Abiuretic Purified Dysentery Toxin.*—*C R Soc Biol* 1929 Jan. 11 Vol. 100 No 1 pp 8-11 [2 refs.] [*Pasteur Inst. & Imperial Inst for the Study of Infect. Dis. Tokyo*]

The toxin is prepared from 48-hour agar cultures as follows —

(1) Heat a thick suspension of growth for 1 hr at 58° C (2) Leave at laboratory temperature under a layer of toluene for 24 hrs (3) Filter through infusorial earth and then through an L3 Chamberland candle (4) Treat the filtrate in the manner already described (see above)

The liquid which remains in the dialyser is called purified toxin No 1 and gives neither the reaction of Millon nor the biuret reaction after it has been concentrated to 1/10th of its original volume. This toxin injected intravenously kills the rabbit in a dose of 0.05 cc. One rabbit showed symptoms of diarrhoea which passed off to be followed by paralysis of the limbs and death. None of the others showed diarrhoea, but either died rapidly or after paralysis. At their autopsy there was, in all cases a characteristic dilatation of the bladder but none not even that with diarrhoea showed any intestinal lesions. This toxin mixed with antidysenteric serum left for 20 minutes at room temperature and then inoculated intravenously caused no symptoms

A further purification of the toxin can be effected by precipitating the "No 1 toxin" completely with 4 per cent. zinc acetate filtering through paper washing the precipitate and dissolving it with dilute ammon.

citrate. To this solution ammon. sulphide is added and it is then filtered. The filtrate is dialysed for 24 hrs. in running water and the liquid remaining in the dialyser is the purified "toxin No. 2."

W F Harvey

MAZZEO (Mario) Neutralizzazione della tossina disenterica mediante la colesterina. [Neutralization of Dysentery Toxins by means of Cholesterin.]—*Riforma Med.* 1928. Nov. 12. Vol. 44. No. 48. pp. 1487-1491. [9 refs.] [Roy Hyg. Inst. Univ. Naples.]

Two types of experiment were performed. In the first experiment cholesterin, in amounts of 0.5 mgm. daily was given with the food to rabbits of about 800 gm. weight for 10 days. The rabbits were inoculated with 1 (0.15 cc.) 2, 4, 5 and 8 minimum lethal doses of dysentery toxin and were able to survive 5 lethal doses. In the second experiment the same series of lethal doses was used, but mixed with the cholesterin and kept for 10 hours at 37° C. before being inoculated. The rabbits were now able to recover after inoculation of 25 lethal doses. These results, although they do not suggest a neutralization of toxin similar to that of antitoxin, have their counterpart in the experiments done by others in the neutralization of tetanus and diphtheria toxins and of rabies virus by cholesterin. Animals in which the suprarenals have been removed are very susceptible to auto-intoxication and other toxæmias. This also points to the probability that cholesterin, which is a product of suprarenal activity is an important factor in the mechanism of natural protection against toxins.

W F Harvey

ENLOW (Ella M. A.) & BROOKS (S. C.) A Comparison of the Agglutinin and Antitoxin Content of Antidysenteric Serums.—*Jl. Lab. & Clin. Med.* 1928. Nov. Vol. 14. No. 2. pp. 103-11. 49 refs. [Hyg. Lab. U. S. Public Health Service Washington.]

Tables are given by the authors showing simultaneous details of agglutination titres and protection of rabbits or mice by control and commercial serums. They point out that the data are inadequate, the statistical analysis unsatisfactory and the probable errors high. On the results, taken as a whole they conclude (1) that there is no necessary parallelism between agglutination titre and antitoxic content as usually measured by protective power nor between this protective power against neurotoxin as compared with enterotoxin but (2) that a slight positive correlation exists between agglutination titre and antitoxic power so that high agglutinin titre tends to be accompanied by high protective power.

W F Harvey

SUZAKI (Keizo) Relation entre l'âge et l'influence de la toxine de la dysenterie sur l'intestin du lapin. [Relation between Age and Influence of Dysentery Toxin on the Rabbit's Gut.]—*Oriental Jl. Dis. Infants* 1928. Nov. Vol. 4. No. 3. [In Japanese. French summary p. 30. *Pediat. Inst. Imperial Univ., Kyoto*.]

The author found that the "dysentery" toxin acted on rabbit's intestine as follows:—

Rabbits 10 days old exaggerated movements of duodenum, jejunum and ileum and feebly accelerated movement of the large intestine.

Rabbits 24-25 days old as above but the movement of large intestine was very feeble or none

Rabbits 50 days old exaggerated movements of duodenum and jejunum. But ileum and colon no acceleration and sometimes a slowing down.

Rabbits over 2½ months old accelerated movement of duodenum and jejunum and slowing down of ileum and colon

H. M. H.

SUZAKI (K.) [The Influence of Dysentery Toxin of the Extirpated Intestine of Rabbits.]—*Oriental Jl Dis Infants* 1928 Sept. Vol. 4 No 2 [In Japanese English summary p 7] [Pediat. Clinic Imperial Univ., Kyoto]

— [The Physiological and Immunological Studies of the Exotoxin of Dysentery Bacilli.]—*Ibid* [In Japanese English summary p 8] [Pediat. Clinic Imperial Univ. Kyoto]

These papers deal with the action of dysentery toxin on the peristalsis of the intestine. The exotoxin of dysentery bacilli has specific immunological property and is common to all the species although produced in far the greatest amount by Shiga bacilli

W. F. Harvey

NEWMAN (R. E. U.) Report on a Trial of Oral Immunization against Bacillary Dysentery in the Western Command, India, in 1927—*Jl Roy Army Med Corps* 1929 Jan. Vol. 52 No 1 pp 7-10 [1 ref]

The immunization was carried out with antidysenteric bile vaccine and the vaccine was administered to volunteers. Care was taken to ensure that these volunteers really did swallow their tablets. The admission rate for bacillary dysentery was made the gauge of successful immunization. Among the volunteers this was 17.24 per mille and for the non immunized controls 40.25 per mille. Cases of protozoal dysentery were excluded. When a similar series of cases at a second station were added to the former the rates worked out at 15.38 and 32.44 respectively (780 immunized 863 controls)

W. F. Harvey

FRANKEL (Ernst) Versuche zur Frage der peroralen Immunisierung II Mitteilung Perorale Immunisierung bei der Maus gegen Shiga Ruhr [Oral Immunization of the Mouse against Shiga Dysentery]—*Ztschr f Immunitätsf u Experim Therap* 1928 Vol. 59 No. 5-6. pp 416-423 [13 refs] [Cancer Research Inst. Univ. Berlin.]

Mice were used because larger numbers amounting to over 400 could be employed in the research. The immunization trials bring out the effects of large moderate and small doses. For the oral immunization a suspension of killed bacilli in normal salt solution was administered with oesophageal sound and syringe after 3 per cent. sodium benzoate. A constantly lethal infecting dose of 120th. agar slope culture subcutaneously was used. The largest doses (20-80 loopfuls) not only had no immunizing effect but seemed to render the test animals more susceptible than the untreated controls. With moderate doses of half a loopful increasing to 5 loopfuls on 3 successive days or on the first fifth and tenth days immunization was shown by increased duration of life and survival of single animals. If these same doses were given

fractionally three times in the day about half the animals (13 out of 22) could be protected. Small doses were ineffective for immunization. How far these results in mice are applicable to man is reserved for another publication.

W F Harvey

Vaz (Eduardo). Sobre o preparo da vaccina antidyssenterica "per os."
(Segunda memoria) [Preparation of Antidyssenteric Vaccine].—
Sciencia Med 1928. Nov Vol. 6. No. 11 pp. 552-563.
[2 refs.] German summary p. 564

The object of this investigation was to save labour and cost in the manufacture of antidyssenteric vaccine on a large scale. It was found that neither the cost nor the incubation time could be diminished without impairment of the efficacy of the vaccine. This trial applied to fluid media vaccines. Several interesting points emerged from the experimentation. The greatest efficacy was found (1) for bouillon cultures as compared with peptone water (2) for 3 weeks incubation as compared with 2, 4, 7, 10 and 14 days incubation (3) for culture in smaller rather than in larger quantities of bouillon—quantities such as 50, 200, 1,000 and 2,000 cc. (4) with good aeration of culture.

Filtrates were capable of immunizing but only if derived from a bouillon with a heavy growth of organisms.

W F Harvey

MIXED AND UNCLASSIFIED DYSENTERY

Khouri (J) Contribution à l'étologie de la dysenterie en Egypte.
[Aetiology of Dysentery in Egypt].—*Bull. Soc. Path. Exot.* 1929.
Jan. 9 Vol. 22. No. 1 pp. 8-11

The author tabulates the results of a long series of observations, 1903-1927 of the frequency of different causes of dysentery and dysenteriform diarrhoea in Egypt. Thus —

	Per cent
<i>Entamoeba histolytica</i> (vegetative)	13.8
<i>Entamoeba minima</i>	2.8
Amoebic cysts	7.3
<i>Balantidium coli</i>	1.2
<i>Lambia</i> (<i>Giardia</i>) <i>intestinalis</i>	0.4
<i>Tetramitus mesnil</i>	0.2
<i>Trichomonas intestinalis</i>	0.7
<i>Schistosomum mansoni</i>	5.8
<i>Schistosomum haematobium</i>	
<i>Ankylostomum duodenale</i>	
Mycoses (Moniliae)	5
Koch's bacillus	0.3
Divers bacteria	65.5
	100.0

	Per cent
Amoebic dysentery in the years 1903 to 1916	28.0
Amoebic dysentery in the years 1917 to 1921	17
Amoebic dysentery in the years 1922 to 1927	9.5

Bacterial dysentery is the most frequent form (65.5 per cent.)—due to Shiga, Flexner, Coli, bacillus and to the enterococcus. [The author

attributes the remarkable drop in amoebic dysentery cases to the increased use of emetine therapy. He does not mention any increased accuracy in diagnosis nor the growing recognition of true bacillary dysentery.]

H. M. H.

THORLAKSON (P. H. T.) **Ulcerative Colitis.**—*Canadian Med Assoc J* 1928. Dec. Vol. 19 No. 6 pp. 656-659 With 3 text figs. [20 refs.]

This paper is a general survey of this disease and it is illustrated with excellent X ray photos of the typical pipestem colon of ulcerative colitis and of the ulceration of the colon in one case malignant. The author's experience lends no support but rather the contrary to the view that BARGEN'S non-mannite-fermenting diplococcus is the causal agent of the disease. In one of his cases a pure culture of this diplococcus was obtained from rectal scrapings but contrary to BARGEN'S reports the autogenous vaccine made from this organism brought about no improvement in the patient. In contrast however is the important finding by the author that by sigmoidoscopy and using a sharp cutting curette with a very small spoon and a long handle he is able to obtain a small section of the base of the ulcer and not merely a surface smear. In four of his last five cases F. CADHAM had been able to isolate *Bact dysenteriae* from these small ulcer sections. Three belonged to Flexner group and the fourth to Shiga. In treatment he has had good results from caecostomy and irrigation and injections of antidysenteric serum. He concludes that ulcerative colitis is due to infection with *Bact dysenteriae* and should be regarded as a form of bacillary dysentery.

H. M. H.

BRUCHMANN (Carlos A.) & DE NUCCI (Luis Stabile) **Enterocolitis disenteriformes graves en la infancia observadas en la ciudad de Santiago del Estero** [**Severe Dysenteriform Enterocolitis in Infants in Santiago del Estero**].—*Semana Méd* 1929 Feb. 23 Vol. 36 No. 9 (1833) pp. 514-519

This is a serious condition perhaps contagious occurring in quite young children usually from one to four years of age. Nearly all have been fed artificially. The stools are loose mucoid sanguinolent and may contain pus 30 to 50 in the 24 hours occasionally as many as 80 some are of the choleraic type. The case-mortality is not stated but two of the six detailed died. The condition is one calling for further study.

H. Harold Scott.

TSUCHIYA (K.) & NAGATA (S.) [**On Dysentery in South Manchuria.**]—*Jl. Oriental Med* 1928. May Vol. 8. No. 5 [In Japanese. English summary pp. 71-84 9 refs.]

(1) Since 1923 dysentery cases and deaths from dysentery have been numerous and increasing.

(2) In the last 3 years most cases have occurred in June July August and September.

(3) In South Manchuria Shiga bacillus was isolated mostly from cases in children. Its toxicity was greater than that noted in Japan.

H. M. H.

MAHLER (P) Obstipatio spastica postdysenterica. [Post-dysenteric Spastic Constipation].—*Verh Klin* 1928 Sept. 7 Vol. 24 No. 36 (1239) p. 1392. [2nd Med. Clinic, German Univ., Prague]

The author gives this name to a syndrome whose main features are rather sudden onset of cramp in abdomen, and nausea, in an apparently previously healthy person, whose medical history however reveals an attack of bacillary dysentery years previously. There is also obstinate colonic spasm accompanying the cramp.

H. M. H.

CAYREY (P. J.) Triple Intestinal Infection in a Case of Dysentery—*West African Med J* Lagos. 1928. Apr Vol. 1 No. 4 pp. 68-69

A Hausa, aet 30 years suffered from anaemia, tachycardia, diarrhoea and slight fever. Faeces contained blood and mucus and ankylostome ova. These ova disappeared finally after treatment with *Oil chenopodia*. Acute dysentery developed and faeces then revealed amoebae and ova of *Schistosoma mansoni*. Both disappeared under emetine treatment and patient was apparently cured.

H. M. H.

SCHILL (Emericb) *Lambia intestinalis* neben Zeichen von Cholelithiasis. [Presence of *L. intestinalis* in Case of Cholelithiasis].—*Dtsch. Med Woch* 1928 Aug 10 Vol. 54 No 32 pp 1337-1338. [6 refs.] 1st Med Clinic, Pázmány Péter Univ., Budapest.]

A male patient 27 years old presented the clinical signs of cholecystitis and cholelithiasis. Duodenal tube contents revealed among other things vegetative forms of *Lambia intestinalis*, and in the stools were found cysts of lambia. The author is of opinion that the lambia caused the gall bladder disease. Duodenal washings with magnesium sulphate 20 per cent. solution, and intravenous injections of 0.15 to 0.3 gm. neosalvarsan were followed by disappearance of lambia from duodenal tube contents and by disappearance of clinical symptoms. The author notes some of the recorded findings of lambia in stool and duodenal contents and the conflicting views of the recorders as to its pathogenic role more particularly as a cause of gall bladder disease.

H. M. H.

KIRSCHIDSE (N.) Zur Frage der pathologischen Bedeutung des *Balanidium coli*. [The Pathological Significance of *Bal coli*].—*Arch. f. Schiff- u Trop Hyg* 1928. May Vol. 32 No 5 pp. 253-255. [Therap. Hosp. Clinic, State Univ. Tiflis, Georgia]

In the last four years 22 cases of *Balanidium coli* infection have been treated in hospital, of which 3 came to autopsy. The author notes that WALKER (1914) by means of experimental infection of apes established the identity of the balantidium of man and pigs. In the Republic of Georgia balantidiasis of man is not rare. It is also a frequent infection of pigs. Thus the author examined 210 freshly killed pigs in the Tiflis slaughter houses and found balantidium in 134=63.3 per cent. Brief descriptions are given of 8 typical cases in men. The predominant symptom was diarrhoea for months or even for a year. The stools are loose and contain with much mucus pus or even blood. The patients complain of pain in abdomen in the region of the colon. Stools may be as frequent as 15 to 20 a day in the chronic cases 5-6. The patients are weak, without appetite, and have low fever. In treatment the

author found emetine in large doses 0.05-0.06 gm and 15 to 20 in injections gave the best results. Cases infected also with *Entamoeba histolytica* and *Lamblia intestinalis* were more difficult to cure.

H. M. H.

SEKI (Yoichi) [Hydrogen Ion Concentration of the Urine of Dysentery]—*Oriental Jl Dis Infants* 1928 Sept. Vol 4 No 2 [In Japanese English summary p 9] [Pediat. Clinic Imperial Univ Kyoto]

The urine of cases of fulminating dysentery, and of pure dysentery had a reaction of pH 5.8 on the first and second days of the disease and was normal again (6.0-7.9) from the third day. Thus there is in dysentery of children an evident acidosis on the first and second days.

W. F. Harvey

- AUROCCHIO (Luigi) Lamebiasi nell etiologia delle sindromi dissenteriche nell infanzia.—*Pediatrics* 1929 Feb 15 Vol. 37 No 4 pp 169-173 [17 refs.] [Inst. of Clin. Pediat. Univ. Naples.]
- CASTROLIOLA (Orlando) Intorno ad un caso di ascesso epatico apertosi nel polmone.—*Arch Ital Sci Med Colon* 1928 Jan Vol 9 No 1 pp 7-21 [Vittorio Emanuele III Colonial Hosp Tripoli.]
- CORKILL (Basil) Yatrien Treatment of Simple Ulcerative Colitis.—*Med Jl Australia* 1928 Nov 10 15th Year Vol 2 No 19 pp 589-591 [5 refs.]
- FRANCHINI (Giuseppe) Un nuovo caso di Buba brasiliana contemporaneo ad affezione da *Entamoeba histolytica* da *Anchilostomum duodenale* e da *Trichostrongylus*.—*Arch Ital Sci Med Colon* 1928 July Vol 9 No 7 pp 387-393 With 3 text figs [Inst. of Trop. Path. Univ. Bologna.]
- GELOWESI (G.) Un interessante caso di epatite tropicale.—*Arch Ital Sci Med Colon* 1927 July Vol 8 No 7 pp 367-374
- Ito (Junzo) [Un cas colon mobile simulant la dysenterie amibienne].—*Jl Oriental Dis Infants* 1928 Nov Vol 4 No 3 [In Japanese French summary pp 29-30] [Pediat. Inst. Imperial Univ. Kyoto]
- DE MEILLO (Frodiano) & PACHICO DE FIGUEIREDO (Francisco) Primeiras experiencias de tratamento Yatriênico em dois casos de amebiasis intestinal.—*Boletim Med e Farmacia Bastora* 1928. Mar-Apr & May Ser 12. Nos. 3, 4 & 5 pp 29-33
- MINTEN (Maud L.) & KRUGH (Helen M.) Insulin Content of the Pancreas following Intoxication of Rabbits with Paratyphoid B Filtrate and Dysentery Bacilli.—*Jl Infect Dis* 1928 Aug Vol 43 No 2 pp 121-125 [2 refs.] [Path. Labs. Univ. Pittsburgh, Pa.]
- METZGER (H.) Ueber eine Behandlungsmethode der chronischen Dysenterie bzw. der Colitis ulcerosa.—*Deut Med Woch* 1928 Aug 17 Vol. 54 No 33 p 1378 [1 ref.] [Municipal Hosp. Neukölln Berlin]
- NILLO (Flavio L.) A propósito del tratamiento de las infecciones por *Giardia intestinalis*.—*Semana Méd* 1928 Dec 6 Vol. 35 No 49 (1821) pp 1616-1617
- PIRAMI (Ester) Sulla cistite amebica.—*Arch Ital Sci Med Colon* 1928 Mar Vol. 9 No. 3 pp 143-165 [38 refs.] [Inst. of Trop. Path. Univ. Bologna]
- POZZO (Fernando) & OLIVÁN (Narciso) Abceso hepático amebiano en un niño de 12 años.—*Semana Méd* 1928 Nov 29 Vol. 35 No 48 (1820) pp 1483-1485 With 2 text figs
- STERN (E.) Behandlung der Amöbenruhr.—*Med. Klin* 1928 Oct. 19 Vol. 24 No 42 (1245) pp 1627-1628.
- TAKEDA (Shunichiro) [Examen des fonctions du foie chez les enfants souffrant de dysenterie].—*Oriental Jl Dis Infants* 1928 Nov Vol. 4 No 3 [In Japanese. French summary p 24] [Pediat. Inst., Imperial Univ. Kyoto]
- YAMASAKITA (Hideo) [Un cas de tuberculose de l'intestin simulant la dysenterie].—*Oriental Jl Dis Infants* 1928 Nov Vol. 4 No 3 [In Japanese French summary p 29] [Pediat. Inst., Imperial Univ. Kyoto]

SPRUE.

Low (G Carmichael) Sprue an Analytical Study of 150 Cases.—*Quarterly J. Med.* 1928. July Vol. 21 No. 84. pp. 523-534 [Hosp. for Trop. Diseases, London.]

The 150 cases which form the basis of this study were all treated in London during the last twenty years. The youngest patient seen was 21 the oldest 75 years of age when the age incidence is divided into periods the maximum number of cases occurs in the middle period of life, from 30 to 60. More males than females were seen, 112 males to 38 females, but this does not necessarily imply that the female is less liable to the disease. The duration was computed in 113 cases in 82 the illness lasted under one year in 2 over nine. As regards the place of infection the majority came from India (68) especially Bombay (7), China (27) Ceylon while others came from Malaya, Mesopotamia, East Africa (2) West Indies British Guiana, Mexico Fiji (1) and North Queensland (2). In 61 per cent. a history of some previous debilitating illness was obtained and a definite relationship could be traced. A definite connexion between hull diarrhoea and amoebic dysentery apparently exists the one infection merging imperceptibly into the other. Syphilis is so frequent that a syphilitic pseudo-sprue seems to be produced which yields to anti-syphilitic remedies. In 14 only out of the series no tongue or mouth symptoms existed nor could a history of such be obtained. In 4 instances only were oesophageal symptoms present. The characteristic diarrhoea was present in all but 9 cases and, as is well known, the total faecal fat content is high in a native Indian case recorded it was as high as 67.86 per cent. Flatulence is a dominant symptom and was present in 50 per cent. In 42.2 per cent. marked shrinkage of the liver was noted. As regards the anaemia great variation was noted in 45 instances the red cells numbered from four to five million while in 5 the blood count was normal. Only in those cases with great anaemia is a leucopenia noted. Other symptoms recorded are cachexia with pigmentation of the skin, mental changes, oedema of feet pyrexia dry atrophic skin, cramps in muscles, vomiting, appendicitis, haemorrhoids petechial haemorrhages, cessation of menstruation auricular fibrillation, syncope. Although tetany is described in text-books the author has not seen it in this series. Treatment is conducted on familiar lines. For anaemia blood transfusion and the administration of arsenic either in the form of Fowler's solution or by injection as arsenate of iron, is advocated. Treatment in hospital may have to be prolonged to 29 weeks. The end results of treatment are extremely difficult to estimate. The author considers himself justified in stating that out of 150 cases 22 were cured 60 were satisfactory 22 improved 18 not improved 10 died 20 were unaccounted for.

P. H. Manson Bahr.

ZIESS (Heinz) & POROW (Peter) Die Sprue in Russland. [Sprue in Russia.]—*Seuchenbekämpfung* Vienna. 1928. Vol. 5. No. 4 pp. 225-232. With 3 coloured figs. on 1 plate. [30 refs.] [Tarasewitch Inst. Experim. Therap. & Serum Control & Trop. Inst. Moscow.]

The authors' attention was drawn to indigenous sprue in Europe by the articles of HART-THAYSEN. Having satisfied themselves with a

definition for the diagnosis of sprue and especially the meaning of Thaysen's fatty-diarrhoea they consulted the literature and found some 23 indigenous cases of sprue have been chronicled in Russia since 1921. The geographical distribution is somewhat restricted and includes subtropical Central Asia, Turkmenistan Tashkent Bukhara Soviet Armenia and Tiflis. The extremes of temperature in these various districts which in Tashkent varies from -28.7°C . in winter to 42.6°C . absolute maximum in summer bear out the reviewer's contention that the incidence of sprue is not entirely dependent upon temperature. Most of the patients were of middle age the youngest 14 the oldest 67. As has been noted further East the disease attacks the lighter-skinned races the darker complexioned Bukharans Armenians and Georgians escaping entirely.

Stress is laid on the typical picture of the anaemia of sprue and of the appearances of the tongue which are illustrated by three figures. The authors regret that so far only two practitioners have undertaken to investigate the remarkable blood picture of sprue in Russia. The details of the 2 autopsies performed are also very meagre. They find it difficult to accept any deficiency as the predominating aetiological factor in sprue as Russians are well known vitamin consumers. Finally they advocate a world wide investigation of sprue by experts in many lands based on a prearranged plan.

P H M B

ANTOINE (Edouard) Trois cas de diarrhée grave à allure de sprue. Étude de cette affection tropicale. [Three Cases of Grave Sprue-like Diarrhoea. Study of Sprue.]—*Arch. des Malad. de l'Appareil Digestive*. 1928. Jan. Vol. 18. No. 1 pp 45-65

This study of sprue follows the now familiar lines whilst detailing the researches directed towards disentangling the true etiology of the disease. The three cases described are typical, two from Cuba and one from Mexico all with a considerable degree of anaemia. With repeated blood transfusions and a dietary of calf's liver recovery was rapid remarkable and permanent. All three have now remained cured for 2-3 years and have returned to Central America. The remainder of the paper contains an excellent résumé of modern methods of medicinal and dietetic treatment.

P H M B

FAIRLEY (N Hamilton) MACKIE (F P) & BILLIMORIA (H S) Anaemia in Sprue. An Analysis of 67 Cases.—*Indian Jl Med. Res.* 1929 Jan. Vol. 16. No 3 pp 831-860 With 5 plates (1 coloured) [3 pages of refs.] [Haffkine Inst. Bombay]

From an analysis of 67 cases of sprue the authors have concluded that the red blood corpuscles averaged 3,242,000 the haemoglobin 65.5 per cent. and the colour index 1.0 for the whole series. At the onset the anaemia of sprue is rarely so severe as that met with at a corresponding stage in pernicious anaemia and during its course a severe grade of anaemia less frequently develops. Only 17.9 per cent. of the cases show red cell counts of under 2,000,000 though in two exceptional instances counts of 575,000 and 400,000 per cmm. were recorded. Throughout all stages of the disease 61 per cent. of the cases showed a colour index equal to or exceeding unity while in the

remaining 26 values of from 0.8 to 0.99 were recorded in 19. The blood picture remained perfectly constant, anisocytosis constituting an outstanding feature. macrocytes were rare poikilocytosis and polychromasia, while occurring, are nothing like so marked as in pernicious anaemia. Nucleated red cells were rarely seen. In uncomplicated sprue the leucocyte counts were either normal or there was a leucopenia sometimes associated with a lymphocytosis. Leucocytosis as indicative of some intercurrent infection was observed in 5 out of 60 cases investigated.

A blood crisis is described in sprue and is characterized by a rapid and critical fall in the haemoglobin and red cells. It is generally associated with severe diarrhoea and progresses to a fatal issue without remissions and without corpuscular regeneration so typical of the crisis in pernicious anaemia.

Price-Jones curves were investigated in 11 cases of well-established sprue and closely resembled those in pernicious anaemia, being characterized by marked symmetry and a definite increase in the mean diameter of the corpuscles. Essentially the anaemia is of the megalocytic type.

Van den Bergh readings showed that 54.17 per cent. of cases gave readings under 0.6 units 72.9 per cent. under 0.8 and 91.7 per cent. under 1.2. Hyperbilirubinaemia is more frequent in pernicious anaemia and malaria than in sprue. Deferred blood production, rather than excessive blood loss, constitutes the basis of sprue anaemia. The process commences in an ill-nourished bone-marrow which, poisoned by sprue toxin of alimentary origin, undergoes primary hypertrophy and a secondary atrophy.

P. H. M.B.

SERRA (Américo) The Relation of Sprue to Pernicious Anaemia with a Report on Blood Changes in 45 Cases of Sprue.—*Amer. J. Trop. Med.* 1929 Jan. Vol. 9 No. 1 pp. 49-65. [32 refs.] [Presbyterian Hosp. San Juan, & School of Trop. Med., Univ. Porto Rico.]

Forty-five cases of sprue are discussed in this paper of which twenty six were males and nineteen females. Thirty-eight were white and seven coloured, ranging in ages from 9-60 years.

The large majority of sprue patients lose weight while those suffering from pernicious anaemia exhibit little or no wasting especially of the subcutaneous fat.

Symptoms referable to spinal cord involvement are present in 70 per cent. of cases of pernicious anaemia. In sprue definite cord symptoms are rare.

All are agreed that as sprue progresses the liver becomes small and atrophic, while in pernicious anaemia the organ is either enlarged or remains normal in size.

Fever is present at one time or another in over two-thirds of cases of Addisonian anaemia, but was present in only 20 per cent. of this series of sprue cases.

Examination of the gastric contents probably constitutes the best single method of differentiation between the two diseases. In this series of fractional gastric aspirations in 25 sprue patients, achlorhydria was found in only three instances, while four showed abnormally high

acid values. As the patient improves and the blood rises to normal free acid again appears in the gastric contents. The icteric index is obtained by comparing the unknown serum against a 1/10 000 solution of potassium bichromate as a standard. In six cases of sprue the icteric index ranged from 3 to 5 whereas in uncomplicated pernicious anaemia it ranged from 8 to 12.5

In this series of 45 sprue cases 40 or 89 per cent. showed a colour index of 1 or higher while of the remaining five cases only two had indices below 0.9. The average index for the series was 1.23. In sprue as in Addisonian anaemia the rule is that the colour index varies conversely with the red blood count: thus the lower the count the higher the index and *vice versa*.

Both sprue and pernicious anaemia are accompanied by definite leucopenia with a relative leucocytosis at the expense of the polymorphonuclear neutrophils, eosinophiles and monocytes. In this series the average leucocyte count was 4880 with 55 per cent. neutrophils. In sprue anaemia with marked anisocytosis the macrocyte is the predominant cell. The average in fourteen cases ranges from 7.6 to 8.9 microns. In forty-five sprue cases normoblasts were found in less than 30 per cent. while megaloblasts were present in one case only and this during the course of a blood crisis three or four hours before death.

P. H. M. B.

ASHFORD (Bailey K.) Certain Conditions of the Gastro-Intestinal Tract in Porto Rico and their Relation to Tropical Sprue.—*Amer J Trop Med* 1928, Nov. Vol. 8, No. 6, pp. 507-538. [1 ref.] [Columbia Univ. & School of Trop. Med. Univ. of Porto Rico, San Juan, Porto Rico.]

Digestive incompetence is very common in Porto Rico: such patients describe themselves as bilious or indigestos. Sprue is an urban disease in contrast to pellagra. Full-blooded negroes appear to be immune to sprue. In the acid contents of the bowel the ever-present saprophyte *Monoilia psilosis* finds an enriching medium in which to multiply and becomes a facultative parasite. Family incidence of the disease is one of its characteristics. Acute sprue is comparatively frequent. There is usually a sharp attack of indigestion with much gas formation, cramps and foetid diarrhoea; after a period of intermission a rapidly advancing severe attack of sprue follows. Some time afterwards the classic picture of sprue develops.

The remainder of the paper is occupied by the reiteration of the claims of *Monoilia psilosis* to be considered an aetiological factor in sprue.

P. H. M. B.

MIGUENS (J.) Observation clinique d'un cas de sprue au Katanga [Case of Sprue in the Katanga].—*Bull Méd du Katanga* 1928, Vol. 5, No. 3 & 4, pp. 45-55. [9 refs.]

Dr Miguens was consulted by a European patient who had lived for 40 years on the Congo almost without interruption since nine years of age. He complained of symptoms strongly reminiscent of sprue. The tongue was typical and the diarrhoea consisted of five or six typical motions daily. Embryos of *Strongyloides stercoralis* were found in the faeces but subsequent to thymol treatment their numbers became sensibly diminished and the

condition of the patient much improved. The author believes this to be the first case of sprue described from the Belgian Congo and further that the *Strongyloides* may play an etiological role.

P. H. M-B.

HEGLER (C.) Zur Frage der einheimischen Sprue [Indigenous Sprue].—*Dent. Med. Woch.* 1928. Sept. 7. Vol. 54. No. 38. pp. 1505-1507. [18 refs.] [St. George's General Hosp., Hamburg.]

Hegler relates details of a case which occurred in his practice. The patient was a lady 49 years of age who had never been out of Germany with excoriation of the tongue and mouth and was first seen in 1921. Early in 1922 aphthous ulcers appeared on the tongue and buccal mucosa, dyspeptic symptoms supervening. A moderate anaemia with erythrocytic changes followed. The clinical picture suggested an early Addisonian anaemia. Soon however diarrhoea set in and wasting became apparent. In May 1923 she presented the picture of a well-established pernicious anaemia with 1 100 000 red cells and emaciation had become extreme. In August, 1923, in spite of repeated blood transfusions and arsenic injections, the weight had fallen to 38 kgm. The tongue still remained intensely red with aphthous ulceration. A disquieting point in the diagnosis was the high coloured liquid, fatty stool. The complete achylia and blood picture still suggested pernicious anaemia. A colleague from the East suggested sprue as the correct diagnosis and consequently a sprue dietary with Plasmon and fruit was instituted. In July 1924 the patient was treated with Uxara tablets and almost immediately a remarkable improvement became manifest. The weight increased to 60 kg and the general health improved to the extent that the patient is now capable of eating anything. For the last two years she has been in normal health. The Uxara in this case appears to have had a specific effect. The differential diagnosis between sprue and pernicious anaemia is discussed at some length.

P. H. M-B.

ASHFORD (Bailey H.) An Evaluation of Liver Extract in the Treatment of the Anemias of Sprue. Preliminary Note.—*Jl. Amer. Med. Assoc.* 1928. July 28. Vol. 91. No. 4. pp. 242-244. With 4 charts in text. Also in *Porto Rico Rev. of Public Health & Trop. Med.* 1928. Aug. Vol. 4. No. 2. pp. 78-80.

Twenty cases of typical sprue, fourteen with the blood picture of pernicious anaemia and six with a secondary type of anaemia, were selected for the purposes of this study. As a control four cases showing no sprue symptoms but with a secondary type of anaemia were selected. Of the twenty sprue patients fourteen were placed on a sprue dietary and received in addition three to six vials of Eli Lilly & Company's liver extract daily. Of the remaining six four were treated by diet alone while one received the diet plus *Morilla pilosus* vaccine, and the remaining one vaccines without dietetic restrictions or liver extract. Blood data were taken before, during, and after a course of liver extract. In normal persons at San Juan, Porto Rico it is estimated that the average reticulocyte percentage is 0.18. In estimating the reticulocytes a thousand erythrocytes were classified by means of a mechanical stage and a ruled disc in the microscope eyepiece. On receiving liver extract five anaemic sprue cases immediately responded and the average

haemoglobin rose from 23 to 93 per cent. The average reticulocyte curve rose to 162 per thousand erythrocytes in a period of twelve days. In one of these patients two blood transfusions had completely failed to raise the blood value. Five others showed an incomplete response but they had been eating liver in a desultory sort of way for some time previous to the administration of the extract. No increase of reticulocytes was seen in the four patients with secondary anaemia. Of the four patients treated by diet alone the reticulocyte percentage started to rise on the fifth day and reached 104 per thousand erythrocytes on the eleventh day. In the last two patients with sprue and severe anaemia treated with and without vaccines the reticulocyte response was small and inconclusive while the four secondary anaemias used as controls showed no response at all.

Ashford concludes that sprue anaemias with a high colour index and less than two million erythrocytes are sure to yield a shower of reticulocytes when Minot's liver fraction is administered unless the bone marrow is hypoplastic. On the other hand an erythrocyte percentage of more than 60 despite a high colour index has so far shown no appreciable increase in reticulocytes. A sprue dietary likewise produces a reticulocyte shower but the response is by no means so speedy or so well sustained as after the administration of liver extract.

P. H. M. B.

RICHARDSON (Wyman) & KLUMPP (T. G.) Sprue. Report of a Case treated with the Authorized Liver Extract Effective in Pernicious Anemia.—*New England Jl of Med* formerly *Boston Med & Surg Jl* 1928 Aug 2 Vol. 199 No. 5 pp. 215-218 With 1 fig. [9 refs.]

A study of a case of sprue originating five years previously in China. The case has claim to serious consideration in the remarkable response the blood showed to an extract of liver comparable to that reported in similar cases fed on large amounts of whole liver.

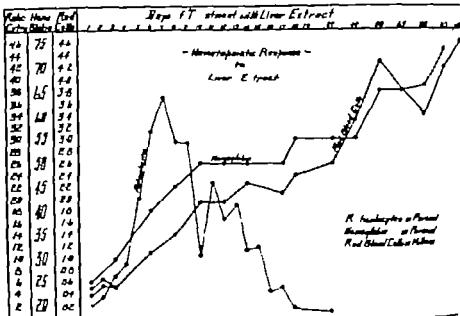
On admission in November 1927 the patient was practically moribund. The tongue was smooth and atrophic the blood pressure registered 100/55 there was slight oedema about the ankles. The blood count was 378 000 per cmm. of which 2 per cent. were reticulocytes. The haemoglobin was 25 per cent. Other blood changes indicating a severe haemolysis were present. The blood serum calcium was 9.8 milligrammes per 100 cc blood. Gastric analysis showed free hydrochloric acid equivalent to 29.2 cc. The stools were typical of sprue.

The commercial extract—an amount derived from 200 grammes of liver (Eli Lilly & Co. Liver Extract No. 343)—was given three times daily in water between meals. The treatment was confined to the one essential liver-extract.

The response was magical. In sixteen days the patient was able to sit up in a chair and at the end of twenty he was well enough for discharge. The stools showed a similar gratifying response. On discharge the patient daily took extract derived from 300 grammes of liver. When last seen on March 22nd 1928 the red blood count was 5 000 000 per cmm. The patient was then told to take daily extract derived from 200 grammes of liver.

The differential diagnosis between sprue and pernicious anaemia is debated.

The rapid improvement of gastro-intestinal symptoms were entirely unexpected. The rise in reticulocytes began on the third day after the liver extract and reached a peak of 37 per cent. on the seventh day. The total red blood cell rise began with the reticulocyte rise and was very rapid (vide chart).



BONE MARROW RESPONSE TO LIVER EXTRACT IN A CASE OF SPRUE

— — — R. E. L. T. R. in Percent
 - - - Red B. Cells in Millions
 — Hemoglobin (Tallqvist) in Percent

[Reproduced from New England Journal of Medicine]

It is interesting that liver soup has been an old native remedy for sprue in Ceylon and has been advised as a routine treatment for sprue in the Hospital for Tropical Diseases, London.

P. H. M. B.

BLOOMFIELD (Arthur L.) & WYCKOFF (Harry A.) The Treatment of Sprue with Liver Extract (843) — *Am. J. Med. Sci.* 1929, Feb. Vol. 177 No. 2 (683). pp. 209-213. With 2 charts. [5 refs.] [Med. School, Stanford Univ. San Francisco]

The present report deals with two further cases of sprue in which satisfactory remission was obtained by Liver Extract 343 (Lily) [see this *Bulletin* Vol. 25 p. 691]

The intensive use of liver was suggested by the similarity of sprue and pernicious anaemia.

The first patient received a preliminary transfusion of 600 cc. of citrated blood but that this played no part in the subsequent course is suggested

by the fact that the blood count was falling when the liver extract was first given. The liver extract was equivalent to 400 to 600 gm daily. There was a gain of 30 lbs in weight and the blood count rose from 740 000 red cells to 5 000 000. The second case which was of three years duration was in a Spanish labourer who had lost much weight. The red blood cells were 2,000 000 the haemoglobin 50 per cent. The patient, restricted to bed was given for two days a liver extract equivalent to 4 800 gm of liver in divided doses. On the third day a typical reticulocyte response began followed by a rapid rise in the red cell count. In spite of the complication of perirectal abscess the patient left hospital in less than five weeks from the beginning of the treatment very much improved.

The results obtained with liver extract are comparable with those seen in pernicious anaemia.

P H. M B

WEST (Randolph) **The Response of Sprue Anaemia to Liver Extract.**—*Porto Rico Rev of Public Health & Trop Med* 1928 Nov Vol. 4 No 5. pp 219-220 [College of Physicians & Surgeons Columbia Univ. New York.]

It has been shown that the material in liver active in pernicious anaemia is soluble in water and in 70 per cent. alcohol but insoluble in absolute alcohol and ether. It is presumably an organic base and contains nitrogen. Seven cases of sprue anaemia treated with known potent liver extract gave interesting responses. Three cases with red blood cell counts of about one million responded well with large and rapid formation of reticulocytes. The remaining four cases with red blood cell counts ranging from 1 700 000 to 2,300 000 gave either very weak responses or none at all. It would appear that not all cases of sprue respond to liver extract with a rise in reticulocytes.

P H. M B

FACIO (A. A.) **Liver and Special Diet in the Treatment of Anaemias.**—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp. 176-179 [United Fruit Company Hosp. Limon Costa Rica.]

During the year 1927 Facio has had under his care several cases of anaemias of different types which have responded miraculously to the liver treatment and a properly balanced diet.

At the beginning of treatment of one patient he weighed only 114 lb he now weighs 142. The illness resembled sprue in its main features with sore mouth, dyspepsia and frothy diarrhoea. The eating habits had been most irregular and the diet had consisted of carbohydrates and artificially sweetened foods. Half a pound of partially cooked ox or calf's liver was eaten daily. For the achylia, 10 drops of diluted nitrohydrochloric acid were given three times daily. After 25 days of this treatment the patient's general condition improved and the blood condition returned to almost normal within four months.

P H. M B.

MACKIE (F P) GORÉ (S N) & WADIA (J H.) **The Bacteriology of Sprue.**—*Indian J Med Res* 1928 July Vol. 16. No 1 pp 95-108. [7 refs.]

Since 1924 92 specimens of sprue stools and 6 of duodenal contents from sixty cases of sprue at different stages of the disease have been

examined. It had been hoped by the study of the various intestinal organisms to arrive at a true picture of the bacterial flora and to find some organisms constantly occurring which might be definitely associated with the disease. These hopes have not been realized although the scarcity of protozoa has been remarked upon. In no single instance was *Entamoeba histolytica* or its cysts seen. Flagellates were seen twice and the scarcity of these organisms is attributed to the high degree of acidity of sprue stools. The pH was found to be as low as 3.5 rarely as high as 6.0 a factor which probably accounts for the scarcity of the dysentery group as well. Yeasts were almost invariably present with fat globules. Cultures made from the circulating blood from 30 cases of sprue were sown on a variety of laboratory media. In two cases only was a bacterium, named provisionally *B. gonicus* isolated an organism which was found once in the duodenal contents of an early and acute case.

In considering more minutely the bacterial flora, a large number of tables and protocols are given about which it was not possible to arrive at any definite conclusions. An atypical strain resembling *Bact. dysenteriae* Flexner was found once *Bact. dysenteriae* Strong once and organisms resembling *Bact. morgan carolinus columbianus* and *asiaticus* organisms of doubtful pathogenicity were each isolated on a few occasions. Haemolytic gas-producing anaerobic bacteria were invariably present when suitable cultures were made, but since these organisms are almost always present in normal stools the observation has little significance. Of the duodenal contents, one case yielded five types of bacteria one four three three and two two. Anaerolytic streptothrix was present in two cases. The cocci obtained from the duodenum were haemolytic.

The authors conclude that the bacterial flora of the duodenal contents of sprue is of special significance, as none of the organisms could be definitely identified with the recognized general pathogenic bacteria found in the intestinal canal in other diseases.

P. H. M. B.

MACKIE (F. P.) & CHITRE (G. D.) The Association of Bowel Disease with Vitamin C Deficiency—*Indian J. Med. Res.* 1928. July Vol. 16. No. 1 pp. 77-84 With 19 figs. on 4 plates (1 coloured) & 2 charts (8 refs.)

It was endeavoured to reproduce the clinical features of sprue in monkeys fed on a diet deficient in Vitamin C. It was found that avitaminosis in itself produced an increase susceptibility to disease of the intestinal tract.

The authors used 16 monkeys in two batches. The first batch of 10 included four controls which were fed on a normal diet and did not receive infected material, i.e. saline suspension of cultures and sprue faeces. The 6 monkeys on a deficiency diet received infective feeds of sprue material. All developed an inflammatory or degenerative condition of the alimentary tract resembling dysentery. In the second batch of experiments all 6 monkeys were maintained on a deficiency diet, but the 3 controls received no infective feeds. All developed the same clinical symptoms and all showed the same post-mortem changes. It was therefore assumed that the vitamin C deficiency was responsible for the symptoms and not the infective feeds.

The symptoms and progress of this vitamin deficiency disease in monkeys as well as the post mortem signs and the morbid histology agree very closely with that described by McCARRISON (1919) the only difference being that in the latter series the duodenum and upper part of the small intestine were equally affected with the large whereas in the present series the upper part of the alimentary canal was almost always free from disease.

The paper is furnished with a large number of details in the shape of protocols and tables of the bacteria present in the faeces of these monkeys. The three accompanying plates of photomicrographs which illustrate the pathological changes in the intestinal canal resemble those of acute bacillary dysentery rather than those of sprue.

P. H. M. B.

MACKIE (F. P.) & CHITRE (G. D.) *Animal Experiments and Sprue.*—*Indian J. Med. Res.* 1928. July. Vol. 16. No 1 pp 49-75. With 6 figs on 1 plate. [7 refs.]

This paper records experiments with different monilias recently isolated from cases of sprue mostly of the species *M. psilosis*. Others were irregular strains and others *M. krusei* a type of wild yeast. Strains of *M. psilosis* were obtained from Col. ASHFORD'S laboratory and from the National Collection of Type Cultures.

The experiments were classified as follows: the result of a single intraperitoneal injection of yeasts into guineapigs; the results of multiple intravenous injections into rabbits of yeasts derived from various sources; feeding experiments; miscellaneous experiments utilizing intralingual, intrathoracic and intravenous inoculations. Further experiments were designed to ascertain whether the virulence of a strain of monilia could be enhanced by frequent passage through a succession of guineapigs. The injection of duodenal fluid from cases of sprue into rabbits was made without ascertainable results.

Having failed to produce signs of sprue in normal animals they attempted to do so in animals suffering from vitamin C deficiency. Monkeys mostly *Macacus sinicus* were chosen and were kept till they showed a loss of weight and other signs of scurvy. Six out of a series of 10 died of dysenteric symptoms which were the result of the scorbutic state. In none was monilia found in the blood stream or viscera and none showed any sprue-like symptoms during life.

The conclusions go to show that when *M. psilosis* and other species of monilia are injected by the peritoneal route a small proportion of animals die of localized peritonitis with or without a generalized septicaemia. No exaltation of virulence results from passage of *M. psilosis* through a series of animals. Feeding experiments were entirely negative and sometimes in the faeces of healthy animals monilia indistinguishable from *M. psilosis* of Ashford were obtained. Finally sprue has not yet been reproduced in monkeys or other laboratory animals.

[The net result of these experiments confirm in a remarkable manner the reviewer's work in Ceylon in 1913 in which extensive investigations on yeasts were undertaken. See *Researches on Sprue in Ceylon*, 1915 p. 144 Appendix 14B.]

P. H. M. B.

MACKIE (F P) & FAIRLEY (N Hamilton) *The Morbid Anatomy of Sprue.—Indian J Med Res.* 1929. Jan. Vol. 18. No 3 pp. 799-825. With 7 plates (2 coloured). [18 refs.] [Haffkine Inst. Bombay]

The material for this study was derived from eight autopsies mostly on Eurasians. The authors are not inclined to stress unduly the weights of the various viscera, because of factors which are difficult to assess in comparing them with standard weights as given in text books. In seven advanced cases of sprue a condition of semi-starvation had existed over long periods and it is well recognized that in starvation the fall of weight is not in equal proportion in all viscera. The small heart often met with in this disease may have a special value in differentiating between sprue and pernicious anaemia. The heart may weigh as little as 2½ oz. The decreased size of the liver does not of necessity imply a specific atrophy but is rather related to chronic starvation in which depletion of the glycogen store is consequent upon deficient carbohydrate intake.

In the emaciated body such traces of fat as may remain are generally of normal appearance and not of the lemon-yellow colour of pernicious anaemia. The tongue is wasted and its surface atrophic—the latter usually in association with the disappearance of the lingual papillae. When the abdomen is opened the intestines are emptied and collapsed, though there may be ballooning of some coils of the small bowel. Often the intestines appear tenuous and semitransparent and sometimes of a pinkish colour due to injection of the small vessels with blood. The mucous lining of the oesophagus may be thin and pale with patchy injection of surface vessels but it shows little that is abnormal. Actual ulceration of the mucosa of the stomach or intestines is uncommon. Once superficial erosions were noted, and on another occasion an isolated superficial healing ulcer about half inch in diameter was met with four inches above the ileo-caecal valve.

The bone-marrow received special attention. In this series the femur was examined in three instances the tibia in five. There was evidence to show that the bone-marrow under the stimulus of some haematopoietic toxin passes through a hyperplastic stage but in the late and terminal phase the erythroblastic response falls with the production of the hypoplastic or aplastic condition of the marrow. This is borne out by the blood pictures of aplastic anaemia so often observed during life.

In every case sections of the tongue have been stained specially for *Monilia* and in a few instances penetration of the mucosa with hyphae of *Monilia* have been seen.

With all precautions to avoid post-mortem decomposition, sections of the intestines were studied. The authors are inclined to the view that sprue is essentially a disease of the intestinal tract and that atrophy of the epithelium is at least a contributory factor in the evolution of the disease. Bacterial invasion of the mucous and submucous coats occurs and it seems that chronic poisoning by such bacteria must play some part in the clinical syndrome. The most noticeable changes are in the villi which show an infiltration with round cells and a degeneration of the epithelial covering. Eventually the villus becomes shrunken and acellular a condition they describe as "withering of the villus." The remains of blood pigment are frequently seen in the subvillous layers.

These findings suggest a specific virus acting on the intestinal tract resulting in degeneration atrophy and diminished resistance of the mucosa to microbic invasion. Haemosiderin probably constitutes only a proportion of the pigment deposit in sprue the nature of the remainder not having been determined. Iron pigment in limited quantity was demonstrated in the kidneys lymph glands intestinal wall and spleen. In view of SCOTT'S theory of parathyroid deficiency in sprue the parathyroid gland was dissected out in three cases but presented no abnormality on microscopic section. The lymphatic system including the receptaculum chyli was examined minutely in one case but no abnormality or interference with the lymph flow was detected.

Finally the authors believe that sprue is primarily a disease of the intestinal tract which if progressive results ultimately in degeneration and destruction of the absorbing and secretory tissues and the production of slow progressive starvation.

P. H. M. B.

MACKIE (F. P.) *The Microscopical Changes occurring in Organs after Death.*—*Indian Jl Med. Res.* 1929 Jan. Vol. 16. No. 3 pp. 827-830 With 3 plates. [Haffkine Inst. Bombay.]

During a study of the changes in the intestines in sprue cases it was realized that some of the appearances described might be due to decomposition. The author therefore made a series of observations on the organs of monkeys portions of the liver kidney and intestines of which were taken for section three six nine and twenty four hours after death respectively. Absolutely fresh material was used as control. The observations showed that microscopic changes due to putrefaction in these organs are discernible three hours after death at room temperature (75° F). The first changes are in the epithelial cells of the kidney and of the intestine and can be recognized by the granular characters of the cytoplasm and by the swelling and indistinctness of the nuclei. As putrefaction proceeds the epithelial cells and parenchyma cells of the liver gradually break up and lose their outlines. Intestinal bacteria begin to penetrate the intestinal mucosa about nine hours after death and putrefactive bacteria are met with in increasing numbers after this time. A study of these changes enables one to distinguish those which have been observed in the intestine as the result of disease.

P. H. M. B.

MACKIE (F. P.) & GORÉ (S. N.) *A Note on an Unrecognised Bacillus Isolated from Sprue Cases.*—*Indian Jl Med Res.* 1928 Oct. Vol. 16 No. 2. pp. 275-280 With 18 figs. on 2 plates.

The organism, provisionally named *B. gomens* was first isolated from the duodenal contents collected during life by the duodenal tube in a patient who was the subject of an early and acute attack of sprue. It was subsequently found in pure culture in the circulating blood of two more cases of well defined sprue. The three strains were identical in reaction. It was not however demonstrated in the duodenal contents of seven other cases of sprue nor in the circulating blood of some thirty others neither was it agglutinated by the blood serum of

either of the cases from which it was isolated in dilutions of more than 1/20 nor by the serum of a few other cases of well defined sprue. In mice it exerts feeble pathogenic powers, but not in other laboratory animals.

The organism is gram-negative and non-acid-fast in sugar media it produces acid in glucose and maltose. Cultures of the organism sent to the Lister Institute were investigated and it was suggested that the organism was allied to *bronchisepticus* or perhaps the *males* group.

The pleomorphism of the organism at first suggested that there might be an admixture of strains, but this is not so. The relationship of the organism to sprue, though its presence is suggestive is by no means considered certain at this stage.

P. H. M.B.

COSTA (Mandry O.) Immunological Investigations on Tropical Sprue in Porto Rico. VI. A Study of the Aerobic Flora of the Stools of Cases of Tropical Sprue. VII. Agglutinins in the Blood in Tropical Sprue for Organisms of the Colon-Typhoid-Dysentery Group.—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Nov. Vol. 4. No. 5. pp. 212-218. [12 refs.] [School of Trop. Med. Univ. Porto Rico.]

The results obtained from bacteriological examination of the stools of 20 sprue patients were compared with those previously obtained from a study of normal faeces. No marked difference was observed. The finding of *Lactobacillus acidophilus* in two cases of sprue can be explained by the fact that these patients were on a strict milk diet and had taken acidophilus milk. It was possible to isolate organisms belonging to the coli (*Escherichia*) group. No true dysentery bacilli were found in any of the cases examined. With antigen prepared from 13 strains of organisms the serum of the sprue patients was tested. In both series (*i.e.* the sprue cases and controls) there were cases in which agglutinins for typhoid or paratyphoid bacilli were present. The net result of the investigation is to the effect that the bacteriological findings in sprue cases do not differ markedly from those of normal controls.

P. H. M.B.

WEISS (Charles) & LANDRÓN (Francisco). Immunological Investigations on Tropical Sprue in Porto Rico. 4. The Biology of *Monilia psilosis* in Relation to Sprue.—*Jl Infect. Dis.* 1928. Dec. Vol. 43. No. 6. pp. 557-564. With 1 text fig. [14 refs.] [School of Trop. Med. Univ. Porto Rico.]

During a two years stay in Porto Rico the authors undertook an investigation upon the biology of *Monilia psilosis*. The optimum pH for growth is found to be about pH7 for Sabouraud agar the optimum is at pH6. *M. psilosis* can be readily killed by heating at 56° C. for ten minutes.

The isolation of *M. psilosis* from the faeces is greatly facilitated by the use of glycerol and bile to inhibit the growth of common faecal bacteria. With this technique the fungus has been obtained from a large percentage of sprue cases and controls. The observations upon the optimum conditions for growth are in harmony with the idea that an increased acidity of the intestinal contents favours the establishment

of the fungus in patients attacked by sprue. Intravenous injection of *M. psilosis* kills rabbits in a few minutes up to 48 hours with visceral embolic lesions. *M. albicans* and a *Cryptococcus* of blastomycosis act similarly. These monilia contain endotoxins which are not haemolytic and are not specifically antigenic when tested intradermally on immunized rabbits.

These observations do not support the theory that *M. psilosis* is an aetiological factor in sprue.

P H M B

WEISS (Charles) Recent Literature on Tropical Sprue.—*Arch Pathology*
1928 Nov Vol 6 No 5 pp 885-899 [66 refs.] [School
of Trop Med Univ Porto Rico]

This paper does not call for a review being itself merely a résumé of the literature of sprue all of which has received notice in the *Bulletin*

P H M B

either of the cases from which it was isolated in dilutions of more than 1:20 nor by the serum of a few other cases of well defined sprue. In mice it exerts feeble pathogenic powers, but not in other laboratory animals.

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COSTA (Mandry O.) Immunological Investigations on Tropical Sprue in Porto Rico. VI. A Study of the Aerobic Flora of the Stools of Cases of Tropical Sprue. VII. Agglutinins in the Blood in Tropical Sprue for Organisms of the Colon-Typhoid-Dysentery Group.—*Porto Rico Rec. of Public Health & Trop. Med.* 1928. Nov. Vol. 4 No. 5 pp. 212-218. [12 refs.] [School of Trop. Med. Univ. Porto Rico.]

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P. H. M-B.

WEISS (Charles) & LANDRÓN (Francisco) Immunological Investigations on Tropical Sprue in Porto Rico. 4. The Biology of *Monilia pilosis* in Relation to Sprue.—*Jl. Infect. Dis.* 1928. Dec. Vol. 43 No. 6 pp. 557-584. With 1 text fig. [14 refs.] [School of Trop. Med. Univ. Porto Rico.]

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The isolation of *M. pilosis* from the faeces is greatly facilitated by the use of glycerol and bile to inhibit the growth of common faecal bacteria. With this technique the fungus has been obtained from a large percentage of sprue cases and controls. The observations upon the optimum conditions for growth are in harmony with the idea that an increased acidity of the intestinal contents favours the establishment

of the left eye this eye too regained sight. About two years later both lenses were found to have been completely absorbed. The anterior layer of their capsules presented a small opening through which a normal fundus could be viewed. The vision of each eye with a +11 sphere was 20-30. The patient lived in an isolated district where no treatment likely to produce such a result was to be obtained.

MORTON¹⁶ advocates the omission of an iridectomy when performing intracapsular extraction. He bases his experience on 25 cases and rightly states that this is not a large number on which to base emphatic conclusions. He employs a speculum as a general rule and recommends a careful preliminary training of the patient in movements of the eye. In these respects his experience is somewhat at variance with that of many practised surgeons in India.

EBER¹⁶ reports that he has successfully used the conjunctival bridge flap. He makes his iridectomy on the temporal side of the bridge and assists the delivery of the lens by inserting a forceps beneath the flap. He grasps the lens in the forceps and thus assists its delivery. Irrigation is used to deliver the remaining cortex.

Glaucoma—SMITH¹⁷ considers that the nutrition of the lens and vitreous may depend upon a hypothetical rhythmical action of the ciliary muscle upon the scleral spur. An intense hyperaemia over the ciliary region may re-establish a disordered function of such a mechanism. This would account for the beneficial effect of the subconjunctival injection of cyanide of mercury observed by many in early cataract. Glaucoma is due to an alteration in the nutritive fluid supplied to the vitreous. This induces an oedema of the humour with a consequent advancement of the structures in front of it and an interference with the sluice-like mechanism in the angle of the anterior chamber. He suggests that an intraocular hyperaemia of the secreting mechanism which is associated with the period of low ocular tension following a successful operation may prove a most important factor in re-establishing the physiological equilibrium of the nutrient mechanism.

WILSON¹⁸ has treated eight cases of glaucoma by intravenous injections of hypertonic saline solution. He finds that (1) It is a most useful procedure for cutting short an acute or subacute attack of the disease. (2) it is an effective and rapid means of reducing a high intra-ocular pressure prior to operation thus diminishing the difficulty of such an operation. (3) its beneficial effect is transitory only. A saturated solution of common salt was used and not more than 1 cc. per kilo of the bodyweight was injected. Ten minutes was the average time occupied in making the injection. It is necessary to exercise great care to ensure that the fluid flows directly into the vein and that none passes into the surrounding tissues.

¹⁶ MORTON (Howard McI) Intracapsular Extraction without Iridectomy.—*Amer Jt Ophthalm* 1929 Feb Vol. 12 No 2 pp 90-98

¹⁶ EBER (Carl T) The Conjunctival Bridge in Cataract Operations.—*Amer Jt Ophthalm* 1929 Feb Vol. 12 No 2 pp 106-108. With 3 text figs [8 refs]

¹⁷ SMITH (Henry) The Nutrition of the Lens and Vitreous.—*Indian Med Gaz* 1928, Nov Vol. 63 No 11 pp 619-620

¹⁸ WILSON (R. P) Osmosis in Relation to the Intra-Ocular Fluids and the Application of the Principle to the Treatment of Glaucoma.—*Bull Ophthalm Soc Egypt* 1928 Vol. 21 pp 47-50 [4 refs.]

MISCELLANEOUS.—Cysticercosis—BURNIER¹⁹ has reported an intra-ocular Cysticercus which he observed in an Italian girl, a patient at the Ophthalmic Hospital of Campinas Brazil. The cysticercus was sub-retinal and was successfully removed. He has found records of 28 previous cases in the Institute. Only two of these were subconjunctival, the remainder being intraocular. All the cysticerci were diagnosed as *C. cellulosus* and half the patients were present or past hosts of the *T. solium*.

Lysozyme—RIDLEY²⁰ in a most interesting paper has recorded his investigations regarding the lysozyme content of the tears. Lysozyme, described by FLEMING in 1922, is an enzyme present in most animal tissues and in many of the secretions, and has the ability to destroy most of the pathogenic bacteria. Its importance, therefore, is very considerable. It is fixed by lecithin and by fats as an adsorption compound, and is probably thus stored in the body. The fact that one gramme of the pure enzyme when dissolved in 100 000 000 gallons of normal saline can produce lysis of a solution of *M. lysodicticus* gives some idea of its potency. In man it is present in great concentration in the leucocytes cartilage tears nasal mucus, and sputum. White of egg is very rich in the enzyme its content being twice that of the tears. Ridley's experiments suggest that a considerable fall in the lysozyme content of the tears might enable staphylococci and streptococci to infect an eye which would have been relatively immune had a normal concentration of the enzyme existed. One of his most interesting findings is that a fall of the lysozyme content always accompanies an epiphora lasting more than a few hours. [This is quite contrary to the usual processes of Nature. One would expect her in the ordinary course to mobilize all possible defences against attack, and the increase of the physical means of protection at the expense of the chemical appears unusual. Exhaustion of the enzyme content of the lachrymal gland affords a possible explanation.] Keratomalacia due to vitamin A deprivation is accompanied by a deficiency of the enzyme and its onset may be delayed by the instillation of normal tears. [This suggests that instillations of egg white solution might prove useful in this disease. Irritant drugs certainly prove positively injurious.] In phlyctenular disease and in interstitial keratitis a fall in the lysozyme titre of both eyes usually occurs even though only one eye is diseased. The author suggests that the beneficial action of atropine in many eye diseases may be due to a diminution of epiphora owing to the action of the drug upon the lachrymal gland and to the consequent increase of lysozyme in the tears. The paper is important and deserves to be read in the original. Also it serves to demonstrate how very important it is, when treating any disease of the eye to search thoroughly for any constitutional defect the treatment of which might serve to increase the lysozyme content of the tears or otherwise to strengthen the natural defences of the body.

¹⁹ BURNIER (J. Penado) Cysticercose ocular. 27a observação do Instituto Ophthalmico de Campinas—*Brazil Medicine* 1928. Dec. III. Vol. 42. No. 51 pp 1424-1427 [13 eds.]

²⁰ RIDLEY (Frederick) Lysozyme an Antibacterial Body present in Great Concentration in Tears, and its Relation to Infection of the Human Eye—*Proc Roy Soc Med* 1928 July Vol. 21 No. 9 pp. 1493-1506 (Sect. of Ophthalm. pp 55-65) With 2 text figs. [8 refs.]

Effect of Ultra Violet Light—The observations of W S and P DUKE ELDER²¹ regarding the action of short wave light upon the structures of the eye have an important bearing on the work of the ophthalmologist in the Tropics. Rabbits were employed for the experiments. The dose of light, while considerably above that which may be used clinically was not greatly in excess of it. In addition to the well recognized lesions of the conjunctiva and cornea changes occurred in both the capsular epithelium and the lens substance. The epithelial cells showed very definite signs of injury and the capsule itself became swollen in places and lost the histological definition of its outline. Throughout a very thin subcapsular zone mild degenerative changes, too could be detected in the lens fibres. The authors concluded that ultra violet radiations cannot be exonerated from a share in the aetiology of cataract. Nor was the retina found to be entirely free from damage. Ganglion cells showed vacuolation with bleaching and disintegration of chromatin. These changes were most evident in the region of the posterior pole of the eye.

REPORTS.—The ²²Giza Memorial Ophthalmic Laboratory was fully completed in the beginning of the year 1927 and its second annual report amply proves how great was the need in Egypt for such an institution. Post-graduate instruction routine pathological examinations the special examination of clinical cases and research work are all included in the work of the laboratory 496 pathological specimens were examined and the report contains microphotographs of some of the more interesting of these. Amongst them is the case of schistosomiasis of the conjunctiva which was referred to in the last article (this *Bulletin* Vol 25 p 990) also a cysticercus cyst of the orbit. 1,367 special clinical examinations were made—379 being by the slit lamp. Research on trachoma, which disease is stated to affect 90 per cent of the Egyptian population, was actively pursued and an organism said to be either identical with or very similar to that isolated by NOGUCHI from trachomatous Albuquerque Indians was successfully cultivated. Chaulmoogra oil was found to have no specific action in the disease and gave no better results than the ordinary methods of treatment. Intravenous injection of hypertonic saline solution (30 per cent.) was found useful in aborting an acute attack of glaucoma. From 30 to 55 cc. was injected and the consequent reduction in ocular tension diminished the difficulties and dangers of an operation. The benefit is, however only temporary and such a form of treatment is therefore of no value in chronic glaucoma.

Steady progress is the keynote of the ²³1926 Report of the Ophthalmic Section of the Government of Egypt. More hospitals have been instituted, 15 per cent. more patients have been treated, and the number of persons found to be blind in one or both eyes has diminished. Acute ophthalmias of which the gonococcus is stated to be by far the most common cause account for over 74 per cent. of the blindness met

²¹ DUKE-ELDER (W S) & DUKE ELDER (P M.) A Histological Study on the Action of Short Waved Light upon the Eye with a Note on Inclusion Bodies. —*Brit JI Ophthalm* 1929 Jan. Vol. 13 No. 1 pp 1-37 With 10 text figs. & 2 plates (1 coloured) [6 pages of refs.]

²² EGYPT Ministry of the Interior Department of Public Health. Second Annual Report of the Giza Memorial Ophthalmic Laboratory Cairo 1927 [WILSON (Rowland P) Director]—53 pp With 22 figs. (4 coloured) Cairo

²³ EGYPT Ministry of the Interior 14th Annual Report of the Ophthalmic Section, 1926

with. The course of these acute ophthalmias is said to be very rapid and destructive. The treatment adopted is painting with 2 per cent. nitrate of silver and frequent irrigation with eusol lotion. Repeated rubbings with 1 per cent. perchloride of mercury solution after a preliminary expression operation appears to be the recommended treatment for trachoma occurring in schools. The comparative infrequency of operations for senile cataract is rather striking. Out of a grand total of 140 783 operations only 1,509 were performed for senile cataract. 345 cases of soft cataract were seen as compared with 4,595 of senile cataract and 16 of lamellar cataract. 3 617 cases of primary glaucoma, and 5 711 of secondary glaucoma were met with.

The 24 Annual Report by P. H. HENNESSY of the Ophthalmic Department of the Ipoh Hospital for the year 1927 shows a steady increase in the daily number of attendances the total number of these was 11,546. The in-patients numbered 505. Conjunctivitis was the most frequent disease met with, and accounted for 2,121 cases, gonorrhoeal ophthalmia for 44 and trachoma for 374. Chinese immigrants were principally affected by this latter disease. 142 cases of cataract were admitted.

The 25 Annual Report of the Ophthalmic Department of the General Hospital, Kuala Lumpur for the year 1927 shows that very similar conditions exist in that district. A VISWALINGAM found catarrhal ophthalmia particularly prevalent between April and May and August and September. A mixed infection of Koch-Weeks and Morax-Axenfeld was the ordinary cause. Keratomalacia was met with fairly commonly amongst young ill-nourished children. The Report deplors the mischief which is worked by quacks amongst the ignorant coolies. This is a common complaint in the East.

H. Kirkpatrick.

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- 24 HENNESSY (P. H.) Annual Report of the Ophthalmic [Department] of the Ipoh Eye-Clinic for the Year 1927 — *Federated Malay States Ann. Rep. Med. Dept. Year 1927* Appendix K pp. 123-138.
- 25 VISWALINGAM (A.) Annual Report of the Ophthalmic Department, General Hospital, Kuala Lumpur for the Year 1927 — *Federated Malay States Ann. Rep. Med. Dept. Year 1927* Appendix L pp. 137-141.
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REVIEWS AND NOTICES

MAXWELL (James L.) [M.D. B.S. London Major late R.A.M.C. Medical Superintendent Tainan Mission Hosp Formosa 1901-1923 etc.] *The Diseases of China including Formosa and Korea.* (JEFFERYS & MAXWELL) Second Edition. pp ix+530 With 176 illustrations. 1929 Shanghai. [£1]

The large section of the profession whose interests lie east of Suez will welcome the appearance of the second edition of *The Diseases of China* by Dr James L. Maxwell of Shanghai. The first edition which was published over twenty years ago under the joint authorship of JEFFERYS and Maxwell, has become a classic in medical literature because it was the first, and has remained the only attempt to make a systematic study of the diseases prevalent in China. In the interval the senior author has retired from active work in the Far East, and Dr Maxwell who as Secretary to the China Medical Association and editor of the *China Medical Journal* has had unique opportunities for instituting a survey of the medical activities of such a vast territory has worthily completed the necessary task of revision.

The introductory chapter gives an excellent account of the ancient empirical art of medicine in China and will be read with interest and astonishment by all students of ethnology. The pharmacopoeia of China is enormous and is chiefly of vegetable origin though inorganic products are also used and drugs of animal origin sometimes give play to remarkable practices. A favourite remedy for sore throat in parts of the country is to swallow a live cockroach in honey.

The greater part of the volume is devoted to medical diseases and here the author's long experience in various Chinese hospitals is shown to full advantage. In the chapter on Acute Infectious Diseases he has unfortunately decided to omit all reference to small-pox, a disease which is noted in his nosological reports as universal in China, and responsible for a heavy mortality. A description of the striking clinical pictures which are nowadays probably unparalleled in any other part of the world would have proved an important contribution to medical history.

In all the diseases dealt with the treatment suggested has been brought thoroughly up-to-date but, as is noticeable in some of the therapeutic measures recommended long residence in the outposts of professional practice leads naturally to a certain amount of dogmatism. For instance in dealing with Malaria he states "It is quite a mistake to suppose that the amount of quinine need be large" in nearly all cases of fever "a dose of quinine three times a day is ample." To the use of intramuscular injection unless in very exceptional circumstances we are entirely opposed. It is obviously an oversight that in the treatment of blackwater fever he advises that Quinine should certainly be administered and by preference *hypodermically* in all cases showing malarial parasites in the blood.

Part III deals with surgical diseases and demonstrates in telling fashion the enormous variety of surgical material available in a population of four hundred millions. The problems which confront the surgeon in China are not due to any unusual pathology they seem to be rather the result of a degree of neglect unknown in Europe.

The moderate cost of this volume was only possible by arranging for its production in China taking this fact into consideration the printing and the binding are admirable. The new edition will take an important place as a work of reference for all tropical physicians and for those who are about to enter upon a professional career in the Far East, it should be an invaluable guide.

J. Anderson.

CHOPRA (R. N.) [M.A. M.D. (Cantab.) Major I.M.S., etc.] & CHANDLER (ASA C.) [M.Sc., Ph.D. Professor of Biology Rice Institute Houston, Texas]. *Anthelmintics and their Uses in Medical and Veterinary Practice.*—pp. xii+291 With 65 figs. on 5 plates. 1928. London Baillière Tindall & Cox, 8 Henrietta Street, Covent Garden W.C.2 [22s. 6d.]

This volume represents a first endeavour in medical literature to give a connected account of anthelmintics. Under each drug the authors attempt to give all the available information on the chemical nature and relationships of the drugs, their history, their physiological effects and their toxicology and contraindications. The various preparations are referred to and the various methods of administration are described and their relative efficacy discussed. The text is divided into three sections, viz. (1) General considerations (2) Anthelmintics acting upon parasites in the gut (3) Anthelmintics used against somatic infections. Section I deals generally with methods of administration and discusses the value of preliminary preparation, the methods of administration of the drugs, the value of post purgation, the criteria of cure, the choice of an anthelmintic and the experimental investigation of anthelmintic drugs. A paragraph is devoted to consideration of the vermucidal effect of elevated temperatures and a word of caution is uttered regarding the possibility of applying the results of Riva's experiments to man. A chapter entitled Helminthological Considerations gives a summary account of the chief worm infections of man and stock for which drug treatment is desirable. This chapter contains a synopsis of the commoner and more important forms including their eggs and larvae. It is doubtful if the ordinary reader could safely apply this differential table to the diagnosis of the various infections without more adequate information or instruction in the technique and terminology of the subject, and he will probably pass on with greater interest to the succeeding chapter which deals with the correlation between chemical composition and anthelmintic action. This fascinating study is of recent origin and dates from the work of HALL and WIDDER in 1917-18. It has been shown that with the introduction of a hydroxyl group into naphthalene, benzene and paracresol vermucidal properties are conferred on these substances producing respectively beta-naphthol, phenol and thymol. This is further emphasised by the fact that when these phenolic compounds are esterified their vermucidal effect is entirely lost. Further studies show that there are several factors and chemical groups to which the anthelmintic action of a drug can be attributed and no common denominator can be found in dissimilar drugs having an anthelmintic action.

In Section II a systematic account is given of the anthelmintics acting on cestodes and on nematodes in the gut: the treatment of intestinal flukes is the same as for ankylostomiasis.

In Section III the antimony compounds and emetine come under consideration owing to their specific action against somatic parasites which are also in some cases susceptible to the action of ordinary anthelmintics.

There are certain inconsistencies in the text which will probably disappear in a succeeding edition. Thus on p. 168 under cautions and contra-indication. It is advisable not to give santonin on an empty stomach faces an account on p. 169 of the special method successfully followed by the authors in many cases in which. The patient is given his last meal at 5 p.m. no food being allowed after that. At 10 p.m. 3 grains of santonin is administered.

The volume ends with a bibliography which, so far as it goes, will prove useful to those interested either in the theoretical considerations or in the practical applications dealt with in the text. Medical Bibliography is, however, notoriously inaccurate and the present contribution requires revision. Trouble would be saved to subsequent workers if citations were verified from the originals and not merely copied from other works.

R. T. Leiper

FÜLLEBORN (F) [Dr med et phil. nat. h. c.] *Filariosen des Menschen*. [Human Filariasis.]—*Handbuch d Path Mikroorganismen* 1929 Lief. 28. Vol. 6. pp 1043-1224 With 77 text figs. & 3 plates (2 coloured) [18 pages of refs.] Jena Gustav Fischer & Berlin & Vienna Urban & Schwarzenberg

Those who heard Professor Fülleborn lecture recently at the London School of Hygiene and Tropical Medicine will turn with anticipation to *Filariosen des Menschen* which essentially constitutes a monograph with 77 figures, 3 plates of which 2 are coloured, and nearly 200 pages of text of which about a tenth are filled with references. The literature is fully and generously cited and to leave two grumbles behind once and for all it should be said that Fülleborn has not been backed by his press reader as closely as his careful work deserves—witness PATRICK MANSON three times, Warrington YORK twice, LOOS and TH A. BANCROFT once as well as slips in less well known names. Moreover zoological names are printed in ordinary type a matter of regret at least to English readers.

Passing on to what really matters the preliminary remarks with which the subject is introduced include a valuable illustrated table bringing out the main points in the biology of the most important filariae. Technique concerns itself chiefly with microfilariae and stresses the importance of exactness. For them a standard means of preparation is essential owing to their variation in size according to their degree by contraction—active when they are alive passive when they have been killed and preserved in different ways and for different times. Measurements which omit this information are of slight value. For accurate counting there must be a square field and a fixed quantity of blood. Yet all such precautions are too commonly disregarded by helminthologists.

The structure of microfilariae as disclosed by different stains is clarified by the coloured plates. The numbers of embryos which have been recovered after death from various organs and tissues are tabulated. The latter point leads naturally to the consideration of periodicity which is held to be a question of the site occupied by the mass of microfilariae at a given moment. When absent from the skin they cannot it is pointed out, be maintaining themselves in the arteries for they have no mechanism by which they could anchor themselves there. But in the capillaries they can it is held do so by taking up a slightly bent attitude so holding themselves fixed against the force of the blood stream—as did Tom the Water Baby against gravity whilst he was still an old time chimney sweep and as do climbers in rock clefts to this day. That which induces this suggested tone in the larval muscles is held to be a reciprocal interreaction between host and parasite caused by some chemical substance. If so we must, it seems conclude that it will during the night lock up *Mf loa* but set free *Mf bancrofti* in most countries but leave unaffected the latter in Fiji and *Mf persians* in all places—provided it is the same substance which affects or does not affect them all.

As will be expected the insect phase is clearly described. It is illustrated by striking drawings and microphotographs. For producing pathological effects the chief place is given to lymph stasis (brought about essentially by adult stages but with the larvae not necessarily out of the picture) with bacterial infection superadded.

In a special section the individual filaria species are individually and fully considered. Their present zoological names are unequivocally stated in the early pages but through the rest of the article Professor Fülleborn has conveniently preferred to retain the genus *Filaria* in its broad sense. The monograph is full of dependable material, little of which has been mentioned but from this many will profit, some with due acknowledgment, others doubtless without, since such disregard is too apt to be the fate of those who ungrudgingly place their treasures at the disposal of their fellows.

Clayton Lane.

DYAR (Harrison G.) [A.M. Ph.D. Custodian of Lepidoptera, U.S. National Museum] *The Mosquitoes of the Americas.*—618 pp. With 123 plates. Carnegie Institution of Washington Publication No 387 1928. May [Paper cover \$ 5.00 Cloth binding \$6.00]

This is a sort of critical supplement, or epitomized revision, of the great monograph by HOWARD DYAR and KNAB of the *Mosquitoes of North and Central America and the W. Indies* which was reviewed some years ago in this Bulletin the first instalments in Vol. 8 p 68 and the last in Vol. 10 p 310. The scheme of that work does not embrace the South American continent in the present volume that deliberate defection is compensated. Again in the earlier monograph most of one large volume is devoted to anatomical and biological detail, to the part played by mosquitoes in the continuance and spread of diseases caused by specific microparasites and to the economic damage thus occasioned, and also to the various methods employed for the restraint and destruction of mosquitoes. All those things there stand apart in a sort of historical whole and therefore in the present purely entomological supplement none of them is separately discussed, although appropriate but brief and circumspect notice is taken of them in the definitions of tribes and genera and species. In the earlier monograph the Culicidae are distributed in three subfamilies—Culicinae, Conithrinae, and Doxinae—in accordance with the views of that discriminating naturalist WILLISTON; that arrangement is assumed in the present work, which also deals exclusively with the subfamily Culicinae. There, again, the Culicinae are disposed in two tribes—Sabethini and Culicini—the latter being further subordinated in four legions, headed severally by *Culex*, *Dinocerites*, *Megarhinus* and *Anopheles*. Here however the precedence of the Sabethini and the phyletic distinction of *Dinocerites* are not so strongly asserted, and the Culicinae are at once distributed in 5 tribes—Sabethini, Culicini, *Uranotaenini*, *Megarhinini*, and *Anophelini*.

The five tribes are rather informally defined in the course of the book, but their bare recognition characters are stated, along with those for recognition of their constituent genera in a common preliminary key or synoptic table the verification of which requires careful microscopic examination of localized setae. The system as the author allows, is difficult. For the ordinary medical man whose interest is limited to the mosquitoes that may come within the professional circuit, a system that has to be interpreted by critical examination of setae is too refined and technical; moreover the specimens that are sent to him for identification too often are not suitable for its interpretation. This criticism is not meant to disparage the author's classification which is also based upon—and is brought in harmony with—study of the larvae. It is merely meant to emphasize the point that the medical man who turns to this book for practical purposes must also be a persevering and well-equipped entomologist.

Of the classification as a product of combined science and art, it need be said that it is a worthy piece of work though weak on the artistic side since the definitions of tribes though freely descriptive do not include a separate and conspicuous enumeration of all the tribal characters—do not, in short, give the reader a perfectly clear impression of the precise significance of the tribal name. On the scientific side one can only say therefore that the life of a zoological classification depends upon what its author takes to be ultimate zoological characters and that on this account, to the unprejudiced zoologist all natural classifications are matters of opinion and must always reside between the endless jar of conflicting opinions. The author's classification has the merit of insisting on the value of larval characters but is not quite free from the common weakness of allowing a single character or some particular dissimilarity to outweigh a large number of common similarities. This latter defect appears in giving tribal rank to *Uranotaenia*. Another matter of opinion is the inclusion in the Culicini tribe of all the scaly brilliant, tree-hole-breeding forms of

Culicini—one would like to see them distinguished from the *Culex* type

The author recognizes 23 genera of Culicinae in the New World namely 1 each of Anophelini, Megarhinini and Uranotaenini, and 10 each of Culicini and Sabethini. One may note as one of the inevitable consequences of the riot that followed the discovery of the pathogenous import of mosquitoes that 83 of the ephemeral genera that strutted and fretted upon the stage between the years 1801 and 1910—not to speak of 17 of later chastened years—here are lighted the way to dusty death 21 disappearing under *Culex*, 42 under *Aedes* and 30 under *Anopheles*.

For discrimination of species the author not only draws upon the usual adult characters but uses also—as far as present knowledge permits—characters furnished by the male hypopygium and by the larva so that for preliminary determinations there are for the constituents of each genus three separate keys—one for each kind of attributes.

The definitions for the exact diagnosis of species which also take the larva into account, are admirably concise and sententious. A special feature of these definitions—as also of the definitions of genera and tribes—and a feature that should please the inquirer who is an entomologist by force of circumstances is their broadly informative character. Thus to take examples of the method in the definition of the Sabethini the recognition characters of the tribe are described in a few words, while an interesting account is given of their breeding places in the moisture held among plants and of their predaceous larvae and among other things the useful information is added that they are economically negligible since only occasionally may they bite man, and many species feed exclusively upon reptiles. Again in the definition of the Caribbean sea shore genus *Dinocerites*, which with its three synonyms is now included in the Culicini and derived from *Culex*, the much elongate antennae which are characteristic, is the only structural feature mentioned in a definition consisting of peculiar facts of distribution, habits breeding places and biting propensities. Once again, exactly half the definition of the species known of old as

Stegomyia fasciata is occupied by biological and historical information at once comprehensive and concise. The author is now confident in the belief that this species is doubtless a native of Africa and was brought to America in the early days perhaps by Columbus himself and in support of the argument of an Old World origin he brings out the cogent facts that whereas in the tropics of the Old World there are many species of the subgenus *Stegomyia* and also many other forms approaching the *Stegomyia* type there exists in the New World only this one particular species and nothing else that even approaches the *Stegomyia* type. It is not amiss to notice as a good illustration of the process of straining at a gnat, that the synonymy of this species here includes twenty-eight names for the same thing, and that the first four on the list are *Culex aegypti* Linnaeus 1762 *Culex argenteus* Poiret 1787 *Culex fasciatus* Fabricius 1805 *Culex calopus* Meigen 1818.

The work is illustrated by 123 plates the first of which explains in semi-diagrammatic fashion the foundations of the author's scheme namely the topography of the pleural setae the structural detail of the hypopygium, and the indicative features of the larvae all the rest show the various specific modifications of hypopygium and significant larval structures that occur throughout the subfamily.

A. Alcock.

STITT (E. R.) [M.D. Sc.D. LL.D. etc.] *The Diagnostics and Treatment of Tropical Diseases. A Compendium of Tropical and Other Exotic Diseases.* 5th Edition.—Revised.—pp. xix+918. With 249 illustrations. 1929. London. H. K. Lewis & Co. Ltd. [31s. 6d.]

Few will at first glance recognize in this large well bound well printed volume the fifth edition of Stitt's well known handbook of Tropical Diseases.

DTAR (Harrison G.) [A.M. Ph.D. Custodian of Lepidoptera, U.S. National Museum] *The Mosquitoes of the Americas*.—616 pp. With 123 plates. Carnegie Institution of Washington Publication No. 387 1928. May [Paper cover \$ 5.00 Cloth binding \$6.00]

This is a sort of critical supplement, or epitomized revision, of the great monograph by HOWARD DTAR and HMAN of the *Mosquitoes of North and Central America and the West Indies* which was reviewed some years ago in this *Bulletin* the first instalments in Vol. 8 p 68, and the last in Vol. 10 p 310. The scheme of that work does not embrace the South American continent in the present volume that deliberate defection is compensated. Again, in the earlier monograph most of one large volume is devoted to anatomical and biological detail, to the part played by mosquitoes in the continuance and spread of diseases caused by specific macroparasites and to the economic damage thus occasioned and also to the various methods employed for the restraint and destruction of mosquitoes all those things there stand apart in a sort of historical whole and therefore in the present purely entomological supplement none of them is separately discussed, although appropriate but brief and circumspect notice is taken of them in the definitions of tribes and genera and species. In the earlier monograph the Culicidae are distributed in three subfamilies—Culicinae, Corethrinae, and Dixinae—in accordance with the views of that discriminating naturalist WILLISTON that arrangement is assumed in the present work, which also deals exclusively with the subfamily Culicinae. There, again, the Culicinae are disposed in two tribes—Sabethini and Culicini—the latter being further subordinated in four legions, headed severally by *Culex*, *Dinocerites*, *Megarhinus* and *Anopheles*. Here however the precedence of the Sabethini and the phyletic destruction of *Dinocerites* are not so strongly asserted and the Culicinae are at once distributed in 5 tribes—Sabethini, *Urbani*, *Uranotaenia*, *Megarhinini*, and *Anophelini*.

The five tribes are rather informally defined in the course of the book, but their bare recognition characters are stated, along with those for recognition of their constituent genera in a common preliminary key or synoptic table the verification of which requires careful microscopic examination of localized setae. The system, as the author allows, is difficult. For the ordinary medical man whose interest is limited to the mosquitoes that may come within the professional circuit, a system that has to be interpreted by critical examination of setae is too refined and technical moreover the specimens that are sent to him for identification too often are not suitable for its interpretation. This criticism is not meant to disparage the author's classification, which is also based upon—and is brought in harmony with—study of the larvae. It is merely meant to emphasize the point that the medical man who turns to this book for practical purposes must also be a persevering and well-equipped entomologist.

Of the classification as a product of combined science and art, it must be said that it is a worthy piece of work though weak on the artistic side, since the definitions of tribes though freely descriptive, do not include a separate and conspicuous enumeration of all the tribal characters—do not in short give the reader a perfectly clear impression of the precise significance of the tribal name. On the scientific side one can only say therefore that the life of a zoological classification depends upon what its author takes to be ultimate zoological characters and that on this account, to the unprejudiced zoologist, all natural classifications are matters of opinion and must always reside between the endless jar of conflicting opinions. The author's classification has the merit of insisting on the value of larval characters but is not quite free from the common weakness of allowing a single character or some particular dissimilarity to outweigh a large number of common similarities. This latter defect appears in giving tribal rank to *Uranotaenia*. Another matter of opinion is the inclusion in the Culicini tribe of all the scaly brilliant, two-hole-breeding forms of

One might also mention that geographical distributions are not always correctly given. The illustrations especially the photographs and microphotographs show a great improvement on those in the previous edition but some of the drawings are still rather crude and it is a pity no scale or note of magnification is given with all illustrations.

H. S. Stannus.

AALSMER (W. C.) & WENCKEBACH (K. F.) *Herz und Kreislauf bei der Beri beri Krankheit.* [Heart and Circulation in Beriberi].—81 pp. With 1 text fig. & 2 plates. 1929. Urban & Schwarzenberg. Berlin N 24. Friedrichstrasse 105 b. Vienna, 1. Mahlerstrasse 4. [Mks. 8].

No satisfactory explanation has yet been given either of the sudden heart failure so common in beriberi or of the dramatic cure brought about by administration of vitamin B. In this monograph an attempt has been made to solve these problems. In the first part Dr Aalsmeer as the result of seven years work in Java describes the clinical findings in slight, moderate and severe cases of beriberi. Very complete clinical details are given of the cardiac symptoms together with observations on blood pressure, X rays of the heart and cardiographic tracings. The leading features of the beriberi heart are dilatation and weakening of the right ventricle, weakening of the left ventricle, increasing stasis in the liver and venae cavae and a normal pulmonary circulation except immediately before death when stasis and oedema develop. There is never any irregularity of the heart nor extrasystole. The electrocardiogram shows no disturbance of stimulus conduction. There is, however, a greatly increased resistance to the electrocardiogram.

In the second part of the monograph Professor Wenckebach discusses the beriberi heart from the theoretical standpoint. He believes that the main feature is the failure of the right heart, characterized by engorgement in the liver and venae cavae. Why this engorgement may not rather be due to failure of the left ventricle is unexplained. More agreement will be found with the suggestion that in beriberi there is increased water retention by the tissue colloids, more especially those of the heart and striated muscle. In the frog's heart immersed in water the rate of conduction is increased and the atrio-ventricular interval is shortened. Similar findings are recorded in severe cases of beriberi.

G. M. Findlay

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE. *Transactions of the Seventh Congress held in British India, December, 1927* [Edited by Lt.-Col. J. CUNNINGHAM, C.I.E. B.A. M.D. I.M.S. Director Pasteur Institute of India, Kasauli, British India, General Organizing Secretary for the Seventh Congress.]—Volume I. pp. xl+865. With 61 plates (4 coloured) & numerous figs, charts & maps. Published for the Seventh Congress by Thacker & Press & Directories Ltd. 6 Mangoe Lane Calcutta.

This large volume is the first of three in which the papers read at the Seventh Congress of the Far Eastern Association of Tropical Medicine are to be given to the world. The Editor notes that the Transactions of the Congress of 1912 occupied a volume of 399 pages and that in 1925 two volumes were required. One wonders to what the Transactions will grow in another ten years. The subjects contained in this volume are Medicine and Dermatology, Pathology, Surgery, Ophthalmology, Gynaecology and Diseases of Pregnancy, Mental Hygiene and Psychiatry, Radiology, Dentistry, State Medicine, General and Special Hygiene.

Maternity and Child Welfare and are those comprised in the first two of the six Sections of the Congress. Eighty-seven papers are here printed, the great majority in English, a few in French. A bare mention of their subjects would be tedious. Some of the more interesting will be noticed in the appropriate place in this *Bulletin* and the *Bulletin of Hygiene*.

A. G. B

WU LIEN TEH [M.D. B.C. (Cantab.) M.D. (Tokio) Director & Chief Medical Officer of the Service etc.] [Edited by]. Reports 1927-1928. North Manchurian Plague Prevention Service. Being Volume VI of the Series.—pp. vi+350 With 71 figs. (2 coloured)

This Report contains about forty separate articles not all of which refer to plague since they include articles on Cholera in China and Japan and chapters on Tuberculosis and Scarlet Fever. Most of the papers have appeared in medical journals and have been noticed in this *Bulletin*. The Report even includes a short autobiography of the Editor Dr Wu Lien Teh who as is well known, has done much good work in Manchuria especially in connexion with pneumonic plague in man, and experimental pneumonic plague among rodents. This form of plague is at times a terrible scourge in Manchuria and only a few years ago more than 70 000 people died in one epidemic. During the two years that have elapsed since the publication of Volume I of these reports the staff of the prevention service has had a fairly quiet time as serious epidemics were absent until the end of the summer of 1928 when there were outbreaks of bubonic plague in Outer Mongolia, Siberia, Shansi and the newly opened-up regions of Fengtien Province. The epidemic was in the hands of the personnel of the prevention service and the outbreak was localized and suppressed at the cost of 500 lives and thirty thousand dollars. Plague among wild rodents especially among the tarabagans is exhaustively treated in a paper reprinted from the *Amer. J. of Hygiene* 1928. The article on recent knowledge of pneumonic plague by Wu Lien Teh is published for the first time. It is compact and interesting but contains nothing that is new. Among the chapters dealing with other diseases and conditions is one on "Biological Investigations among Aboriginal Tribes in North Manchuria, with 21 very good photographic illustrations written by H. M. JETTNER. The problems of cholera and tuberculosis are much the same in China as in other parts of the East.

J. H. Tull Walsh

TROPICAL DISEASES BULLETIN

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[No 7

BARTONELLA MURIS-RATTI AND THE INFECTIOUS ANAEMIA OF RATS

By Lt.-Col. A. ALCOCK, C.I.E. M.B. LL.D. F.R.S. I.M.S. (retd.)
Sectional Editor Tropical Diseases Bulletin

These papers* may well be taken together since all are contributory to a well-defined subject and three of them are or include historical surveys of that subject by protagonists in the field.

LAUDA discovered (1925) that rats when deprived of their spleen usually develop between the 3rd and 10th days afterwards a severe and commonly fatal anaemia the animal becomes emaciated its blood shows in an extreme degree all the familiar features of pernicious anaemia, and after death all the organs appear bloodless and small (sometimes confluent) patches of necrosis may be found in the liver LAUDA has likened the blood-picture to that of acute yellow atrophy of the liver in man and he originally attributed it to an invisible virus—an endogenous virus normally occulted by the spleen and unkennelled in full fury by the removal of that body LAUDA's present paper is a survey of work that has followed from this striking discovery but as SCHILLING points out in one of his papers included here the restrictive influence exercised by the spleen on certain similar infective processes as demonstrated by the removal of that organ, is a phenomenon that had attracted the attention of several earlier observers. LAUDA's paper is not fully documented.

Independent of LAUDA's discovery Martin MAYER in 1921 (see this *Bulletin* Vol. 18 p. 263) had noticed in gravely anaemic rats heavily infected with trypanosomes certain inclusions in the red blood-corpuscles, which, after considering the possibility of their being merely products of corpuscle-degeneration he came to regard as parasites probably congenic with the Bartonella of Oroya fever proposing for them the specific designation *Bartonella muris*. Subsequently he and his colleagues BORCHARDT and KIEUTH (this *Bulletin* Vol. 24 p. 831) recognized them as the infective agents of pernicious anaemia in rats (they are now generally recognized as the material bodies of LAUDA's incorporeal virus) and thus gave the necessary point and impetus to LAUDA's theory of a species of anaemia referable to the outburst of a latent infection normally held in subjugation by the spleen. MAYER's present papers repeat and continue the interesting story

* See references, pp. 523-4

MAYER's colleague, KIKUTH, who has discovered another form or species of *Bartonella*—a form now stated by V. SCHILLING to have a close resemblance to his own "*Erythrokanten*"—associated with haemolytic anaemia in a dog, now gives a well-documented historical review of the *Bartonella* bodies as exchivants of anaemia and upon his and the two preceding papers the following survey of the present voluminous stream from the springs set in motion by LAUDA and MAYER is based, papers already noticed in this *Bulletin* (Vol. 18, p. 263 Vol. 24 p. 831 and p. 873 Vol. 25 p. 254 and pp. 835-839) also being comprised in this survey.

We are reminded in this series of papers that the bodies occurring in the blood of Oroya fever patients and named after their original discoverer BARTON were not at first accepted as independent organisms, but were recognized as such by DARLING in 1911 though they were not officially named *Bartonella* by STRONG until 1915. We are also reminded that STRONG and his colleagues were much taken with their affinity to the genus *Grahamella* instituted by BRUMPT in 1911—an affinity noted by several later observers. But now that the local habitation of the *Bartonella* bodies among the Protista is settled, it seems likely that the inevitable disturbances over names may be expected, upsetting all significant associations with things, since, as will be recounted further on, BRUMPT now tables the statement that the *Bartonella* of rat anaemia (which is said to be only specifically distinct from the *Bartonella* of Oroya fever) is generically the same as *Grahamella*.

The species here in court which until the case is decided by general consent, we may still refer to as *Bartonella sepsis* appears in the blood of rats, from 2 to 7 days after splenectomy in several guises, variously described as coccoids, diplococcoids, dumb-bells, and rods which sometimes form chains or clusters. They are gram-negative, they stain well in Giemsa, and they have been cultivated by MAYER and others, though METELKIN and FORD and ELLIOT here report failure in all their attempts at culture. As an invisible latent infection quickly brought into view by excision of the spleen, it appears to be in some places (as Hamburg) almost characteristic of the rat although there are other places (as the Sicilian town Catania) and there are certain breeds of rats (as at the Wistar Institute) where it does not exist. Moreover though it commonly exists as a latent infection, JAFFE and WILLIS state (see this *Bulletin* Vol. 25 p. 835) that in rats in Illinois, four weeks old, with the spleen intact *Bartonella* bodies may be numerous in the blood. Furthermore although the infection is most surely brought out by desplenation it may also sometimes be excited by chemotherapeutic shock and possibly by other kinds of injury. Its presence in the blood in desplenated rats is almost invariably associated with pernicious anaemia, and that this association is causal is a logical inference from the facts that it has been observed to precede the anaemia, that the severity of the anaemia varies with the intensity of the infection, and—as FORD and ELLIOT have observed in the transmission experiments reported in their present paper—(a) that washed *Bartonella*-infected corpuscles always produce the anaemia, whereas the corresponding plasma either fails to do so or else causes only a tardy and mild anaemia with few *Bartonellae* in the blood. (b) that the thermal death-point of *Bartonella* and the thermal extinction-point of haemoclastic virulence of the *Bartonella*-infected blood are identical, and (c) that the *Bartonella* may be transferred from rat to rat through

thirty generations of infection and always proves concomitant with the haemoclastic virulence. The experiments reported by VEDDER, too have neatly confirmed both the causal relation of the Bartonella to the haemolytic anaemia and the restrictive influence exercised by the spleen. In these experiments when a part of the spleen was left unexcised the anaemia did not occur and when the excised spleen was implanted in the scrotum it protected against the anaemia for some time spleen extract however had no such effect (nor had liver extract — pernaemon — any curative action) FORD and ELIOT too in their transmission experiments by inoculation found that the admixture of spleen pulp with infected blood had not any neutralizing effect. The controlling function of the spleen has been ingeniously corroborated by CANNON and McCLELLAND who find that in their Wistar Institute breed of rats which is void of the latent infection the average weight of the spleen is about a quarter of one per cent. of the body weight, whereas in the ordinary infected rat it is about three times as great.

The duration of the visible infection in the blood of the desplenated rat varies inversely with its intensity. According to MAYER and KIKUTH a heavy infection may be fatal in a few days but a slight infection has been observed by them to continue as long as 30 days. V. SCHILLING in his latest paper (1929) states that he has observed an infection that lasted 56 days and an infection transmitted to a desplenated mouse to last up to 72 days and in this paper he also makes the significant statement that in these long-continued infections certain cells of the bone-marrow may be found charged with inclusions that probably are Bartonella bodies.

Some facts mentioned by LAUDA, bearing on the evolution of immunity may here be noticed namely that the Bartonella infection has occasionally been observed in apparently healthy spleen-entire rats and that such rats when desplenated, suffer only a mild form of anaemia.

The study of the natural mode of transmission of the disease among rats is made peculiarly difficult by the coupled obstructions that the infection visibly declares itself only in the desplenated rat and that no given spleen-entire rat may now be assumed to be clear of a (latent) standing infection. MAYER is satisfied that he overcomes this difficulty by curing a desplenated rat of its infection (by a moderate dose of salvarsan) thus rendering it available for experiment. CANNON and McCLELLAND put their trust in a stock of laboratory rats from the Wistar Institute which stock is free of the latent infection. Another obstruction is the prevalence of minute and inconspicuous ectoparasites of the rat. MAYER overcomes this by the use of lysoform, and then by keeping his clean rats isolated under a sterile ménage (and dietary).

In the search for the natural route MAYER tubed a small quantity of infected liver pulp into the stomach of a rat so sterilized, and the animal acquired a slight infection from which it recovered. SORGE, however could not infect rats by feeding them on infected liver (see this *Bulletin* Vol. 25 p. 839). Several observers have transmitted the infection by contact and CANNON and McCLELLAND using Wistar Institute rats carefully cleansed from ectoparasites here describe how they infected them by means of rat lice (*Haematopinus spinulosus*) taken from desplenated infected rats. M. MAYER also in his paper in *Klin. Woch.* Dec. 9 1928 describes how he isolated and kept under a sterile ménage and dietary some desplenated rats that had been sterilized inside and outside in the way already mentioned and in course of time

obtained from them a progeny of 13 innocent young. When they were about 2½ months old these carefully kept young were desplenated and found to be free of infection. About 2½ months afterwards eight of these immaculate young were allowed in different ways to become infested with lice (*Haematopinus spinulosus*) from a very lousy rat, and from 10 to 24 days afterwards, all but one of them had become infected with *Bartonella* and two had died from anaemia. The controls all remained healthy and free of infection.

B. muris rattii has been communicated by the usual laboratory methods to other desplenated rodents (mouse and hamster) as well as to desplenated rats that have recovered from an earlier infection, but SORGE (l.c.) could not transfer it to rabbits, guinea-pigs, monkeys, or dogs desplenated or otherwise.

The two papers, one by LAUDA, the other by KIKUTH both entitled *Die Bartonellen* are reviews of the group, and to KIKUTH's paper a very full bibliography is attached. The following species have to be noticed: (1) *B. bacilliformis* of Strong (1915) the anaemia excitant in Oroya fever; (2) *B. muris* of Mayer (1921) excitant of rat anaemia; (3) *B. canis* of Kikuth (1928) discovered in a dog suffering from canine piroplasmosis, as a massive infection of the red corpuscles, six days after the animal's spleen had been excised—at the same time a rapid decrease in the number of red corpuscles occurred, a fall of haemoglobin to 20 per cent. and much aggravation of the piroplasmosis. Subsequent experimentation seemed to show that although latent infection is uncommon, the spleen in dogs exercises a restraint upon the infection. KIKUTH also mentions (4) another species, discovered by REGENDANZ and himself in two species of desplenated opossums in Brazil and he thinks that (5) the inclusions noticed by NOGUCHI in red corpuscles of a hamster and a white mouse, and (6) the organism observed by von NAUCK in the blood of a squirrel in Peking—all these being desplenated animals—as well as (7) some apparently non-pathogenous inclusions observed by ZUCKER in the red corpuscles of a field-mouse with spleen intact, should all be classed with *Bartonella*. LAUDA, after examining the original preparations, here declares (8) the inclusions noticed by EDELMANN in a typical case of Werlhof's *morbus maculosus* in man to be *Bartonella*. (9) The "bacilliform bodies" (*Grahamella Bartonella*) observed by SHOURHA and ALY (1925) damaging the red corpuscles in the Egyptian gazelle must also, probably be included in the genus. We come finally to the "Erythrokonten" and other ambiguous but interesting forms that V. SCHILLING has separated.

Erythrokonten (see this Bulletin Vol. 25, p. 838) are bacilliform bodies observed by V. SCHILLING in 39 out of 42 cases of pernicious anaemia in man but considered by him to be related neither naturally to *Bartonella* nor causally to the pernicious anaemia, an opinion from which LAUDA, MAYER and others dissent. In his latest paper however (Jan. 1929) SCHILLING foreshadows a possible change of opinion, brought about by some new forms of corpuscle-inclusions that have attracted his attention in the blood of desplenated white mice. One of these, separated under the name (11) *Eperythrosom coccoides* consists of minute (½µ) not (or very slightly) pathogenous, coccus-like bodies adherent in clusters to the surface of the red corpuscles. In a text figure, where they are compared with *Bartonella* and *Grahamella*, they are shown as rings or disks. The infection shows itself independent of a simultaneous *Bartonella* infection and can subside or intermit

in the presence of it it is transferable to white mice by inoculation especially if the animals have been desplenated it subsides spontaneously becoming latent. A latent infection becomes strongly intensified after removal of the spleen sometimes the day after. The other and more significant new form to which has been given the name (12) *Bartonella muris musculi* var. *albini* Schilling 1929 includes bacilliform bodies resembling both *B. canis* of Kikuth and *B. bacilli formis* of Strong and also like *B. canis* resembling Schilling's Erythrokonten, and it would appear that it is this likeness to one another of things that resemble the same thing that has suggested to SCHILLING the necessity for reconsidering the sunderance of the Erythrokonten and Eperythrozooa from Bartonella.

There still remains for notice a paper by BRUMPT which *per purum tonans* threatens to annihilate the name Bartonella and as nomenclature is very much an independent subject, and generic definition more than most things human a matter of opinion this paper is best considered apart.

In 1911 BRUMPT encountered in the blood of a mole the intracorpuseular parasite discovered in 1905 in that species of animal by GRAHAM SMITH at Cambridge and on a study of it he established the genus *Grahamella* Brumpt 1911 genotype *Grahamella talpae*. Species of this genus are now known to be distributed in 21 species of rodents 3 species of insectivores, 3 species of bats a monkey and perhaps a bovine but only one author—O BRIEN cited by MACFIE—has associated its presence with any morbid symptoms. BRUMPT notices as a coincidence that it was in 1905 that BARTOV first observed the bodies eventually (in 1915) named after him in persons suffering from Oroya fever.

In 1914 in São Paulo BRUMPT several times found in the blood of brown rats a parasite which he seems to have set apart for a time, since in 1915 it was brought to light in the same place (São Paulo) by CARINI who named it *Grahamella muris*.

Since that time BRUMPT has studied the parasites of anaemic desplenated rats in his own laboratory and has again referred to his specimens from São Paulo and he now states in short that it is incontestable that the parasite of rat anaemia belongs to the same genus as the parasite of the mole made known by GRAHAM SMITH in 1905. So that if this opinion becomes generally accepted *Bartonella muris* Mayer 1921 will be a synonym of *Grahamella muris* Carini 1915.

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HELMINTHIASIS

PORTER (Annie) *Notes on the Distribution of Animal Parasites in Street Dust examined in Johannesburg from 1925 to 1928*—*Jl Med. Assoc. South Africa* 1928. Nov 10 Vol. 2 No 21 pp. 571-577

Gross dust from the street-gutters or hollows in roads in Johannesburg has been examined for evidence of animal parasites injurious to human health and to obtain information on the rôle of wind and road dust in the propagation of helminth disease. The dry street dust was examined directly under the microscope. In addition suspensions were made in distilled water. The results are set out in tabular statements. The animal parasites found are listed with the various localities in which they were found. The list is too extensive for citation here. The article concludes with some general remarks. It is suggested that further efforts in the provision of street watering should be made during the dry season. The finding of ova of worms in places where building operations are in progress indicates the need for better supervision of natives and of greater care in the use of the sanitary buckets. [The viability of the ova found in dry street dust is not discussed.]

R. T. Leiper

BLIGH PEACOCK (N) *Intestinal Worm Disease in the Ankole District, Uganda.—Kenya & East African Med. Jl* 1929 Jan. Vol. 5 No 10 pp. 333-335

Useful statistics have been derived from the records kept by a medical officer on Safari in which the display of actual specimens of *Ascaris* and *Taenia* has enabled diagnosis to be made from the patients' statement as to their occurrence in the stools. In 8 successive working days at Katwe-Ibanda in Northern Ankole, Uganda in April 1927 it was found that 46 per cent. of the sick infant population was extensively infested with *Ascaris lumbricoides*. The author is of opinion that the questioning of the child's mother gave a proportional accuracy of not less than 75 per cent. Santonin and calomel followed if necessary by glycerine enemata, formed the routine treatment.

R. —

WATSON (W. H.) *Notes on the Incidence of Hookworm and Helminths in North Nyasa.—Nyasaland Protectorate Annual Rep for Year ending 31st December 1927* Appendix 25-27

The percentage of ova in a survey of 100 stools was tabulated. Hookworm occurred in 64 per cent. *Strongyloides* in 15 *Ascaris* in 5 *Taenia saginata* in 4 *Strongyloides* in 1 per cent. Drainage is an important factor in the incidence. The low infestation with *Ascaris* is probably due to the fact that the inhabitants obtain drinking water from the rivers.

Hæmoglobin percentages taken by the Tallqvist Hæmoglobin Scale showed an average of 67.95 in 100 males and 62.6 in 100 females. Malaria cannot however be excluded from these cases. In the upland area of Nkamanga the average percentage was slightly higher. 55 High School boys and men at Livingstonia Mission gave an average of 83.8. They are accustomed to the use of latrines and are excellent examples of what sanitary education can do. The incidence of filarial infections at Karonga is as follows: *Microfilaria bancrofti* 16.5 per cent. (or 31 out of 187) and *Microfilaria peruviana* 1 per cent. (2 out of 187).

R. T. L.

RAYNAL (Jean) Helminthiases intestinales chez le Malgache. [Intestinal Helminth Infection in the Malagasy]—*Bull. Soc. Path. Exot.* 1928. Dec. 12. Vol. 21. No. 10. pp. 868-873. [1 ref.]

Studies on 620 of the Madagascar troops garrisoned at Marseilles gave a percentage of 77.42 per cent. with helminth infections. Previous anthelmintic treatment apparently effected a reduction only in the numbers of parasites rather than in their variety. Ankylostomes occurred in 56 per cent. whipworms in 50 per cent. roundworms in 25 per cent. although a recently landed contingent had 75 per cent. Strongyloides was rare and came chiefly from Tamatave. Three cases of Dibothriocephalus were noted. Residence in France resulted in marked reduction of parasitism, the percentage falling from 85 per cent. in the case of recent arrivals to 45 per cent. in those of longer residence.

R. T. L.

KORAYASHI (Harujiro) On the Animal Parasites in Chosen (Korea). Second Report.—*Acta Ued. in Keijo*. 1928. Vol. 11. No. 2. pp. 109-124. [40 refs.] [Med. Faculty Keijo Imperial Univ. Keijo, Japan.]

In this paper the author tabulates the statistical findings of previous observers for the various helminth ova in man in Chosen [Korea]. On Paragonimiasis he remarks that patients occur in all provinces of Chosen except North Kankyo-Do. Five out of the 12 species of *Alaria* which occur in Chosen are intermediaries. These are *M. libertina* *M. extensa* *M. paucispinosa* *M. goltschii* and *M. nodifera*. Three crustacea are known to be second intermediary hosts, *Eriocheir sinensis*, *Cambaroides sinensis* and *C. dawsoni*. The capture of these crabs and crayfish is now prohibited. The collection of snails in certain regions reduced their numbers to about one-third and the infestation of the crabs then ceased. *Clonorchis sinensis* prevails in southern Chosen. The *Bulinus* (*Bulynia*) *striatulus* usually inhabits swamps and ditches, but its occurrence in the river Kinko is mentioned. Anto and Shobei are new endemic foci, while *Parapeleus cingulatus* and *Sarothamniellus kobayashii* are recorded as new second intermediate hosts. *Schistosoma japonicum* has been recorded on one occasion only from Chosen. The author considers that it is absent and that Mills mistook the eggs of *Paragonimus* for those of *Schistosoma*. These were found in an inguinal hernia.

Of tapeworms *T. saginata* is the most prevalent. *D. latus* is fairly common. *Cysticercus cellulosae* has been reported from pigs in northern Chosen but no adults have been found by the author although MUTA has recorded their presence. A fourth case of *Sparganum mansoni* is recorded and a new host has been found in *Erinaceus amurensis koreensis* in which the worm develops to one metre in length.

Both *Ancylostoma* and *Necator* occur in man and prevail more in the south than in the north of Chosen. *Trichostrongylus orientalis* is very common. *Filaria bancrofti* occurs and a unique case of *Dracunculus medinensis* has been found in a Chosenese who had never travelled outside Chosen.

R. T. L.

HAKKI (Ismail) Ueber die Verbreitung von Darmparasiten in der Türkei. [Distribution of Intestinal Parasites in Turkey]—*Cent. f. Bakt. I. Abt. Orig.* 1928. Sept. 26. Vol. 108. No. 7/8. pp. 393-394

As Professor of Parasitology in the Medical Faculty in Constantinople Dr Hakki has interested himself in the incidence of protozoal and helminth parasites in Turkish children. From an examination of 800 stools he has been able to list the following helminths: *Hymenolepis* 30 (3½ per cent.) *Dibothriocephalus latus* 60 (7½ per cent.) *Ascaris lumbricoides* 150 (18½ per cent.) *Oxyuris vermicularis* 180 (22½ per cent.) *Necator americanus* 25 (3½ per cent.) *Ancylostoma duodenale* 5 (½ per cent.) *Trichuris trichiura* 170 (21½ per cent.) He remarks that he has also seen on several occasions specimens of *Taenia saginata* and rarely of *T. solium*.

R. T. L.

DE RIVAS (Damaso) & FIFE (Charles A.) Intestinal Parasitism in Philadelphia.—*Jl Amer Med Assoc* 1929 Feb 23. Vol. 92. No. 8. pp. 624-627 [1 ref.] [Dept. of Parasit. Univ. Pennsylvania.]

Of 275 adult patients in the Polyclinic Hospital, Philadelphia, 2 were found with *Dibothriocephalus latus* and 2 with *Trichuris trichiura*. Of 237 children from the General and Presbyterian Hospitals and the Mary Drexel Home 3 harboured *Trichuris*, 1 *Hymenolepis nana*, 1 *Ascaris*. [The protozoal infections are not dealt with in this abstract.]

R. T. L.

NAGAYO (M.) A Review of Some Recent Studies conducted in Japan on Parasitic Diseases.—*Scientific Reports Govt Inst Infect Dis Tokyo* 1927 Vol. 6. pp. 503-509

Owing to its geographical situation Japan is rich in parasitic infections for its territory extends from arctic to subtropical zones. Parasitic diseases play an important part in medicine and hygiene and their elucidation has been the subject of numerous researches by Japanese

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workers. The author briefly reviews their contributions to new knowledge of nematodes trematodes and cestodes and their influence on the later elucidation of allied problems in other parts of the world.

R. T. L.

FUJIMAMI (Akira) Uma viagem de investigação medica ao Brasil. [Investigations during a Visit to Brazil].—*Scientia Med.* 1928. Oct. Vol. 6. No. 10 pp. 483-490

Professor FUJIMAMI and his assistant visited Brazil from Japan, taking a sort of busman's holiday and spending the time in examining the faeces of nearly 700 Japanese immigrants on board before disembarkation and continuing his investigations in company with Professor CHAGAS and Dr. da FONSECA of the Oswaldo Cruz Institute after landing. His investigations were nearly all helminthological. He found 63.6 per cent. of the total infected with hookworm (*Ancylostoma* and *Necator*) whereas among those on board only 22.7 per cent. were detected. *Ascaris lumbricoides* and *Trichuris trichiura* were present sometimes in large numbers. He also met with *Oxyuris vermicularis*, *Strongyloides intestinalis* [figures not given], *Trichostrongylus orientalis* (2.1 per cent.), *Metagonimus yokogawai* (0.8 per cent.) and *Clonorchis sinensis* (1.1 per cent.). Neither *Paragonimus* nor *Schistosoma japonicum* was discovered. A few were harbouring *Taenia solium*, *Hymenolepis nana* and *H. diminuta* but none of the Japanese immigrants showed indication of infection by *Sch. mansoni* though this is rife in some of the Brazilian estates. No Japanese children under one year born in Brazil were found infected with any worms.

Apart from the above the immigrants suffered severely from malaria and many presented lesions of American leishmaniasis and they were attacked equally with the indigenous races by Chagas's disease, blastomycosis coccidioides, and amoebic dysentery.

H. Harold Scott.

FELDT (A. M.) Influence des invasions vermineuse sur sécrétions du pancréas. [Influence of Helminth Infestation on Pancreatic Secretion].—*Russian Jl Trop Med.* 1928. Vol. 6. No. 7 pp. 419-427 [In Russian. French summary p. 427]

From a study of 18 cases of infection with helminths (including 10 *Taenia saginata*, 3 *Fasciola hepatica*, 1 *Taenia solium*, 1 *Oxyuris vermicularis*, 1 *Trichuris trichiura* and 1 *Dibothriocephalus latens*) the author concludes that the secretory activity of the pancreas was not markedly affected.

R. T. L.

PEVERELLI (P.) Het zoeken naar Wormeieren met behulp van Cederoliepreparaten. [Search for Worm Eggs by Means of Cedar Oil].—*Geneesk. Tijdschr. v. Nederl. Indië.* 1928. Vol. 68. No. 7 pp. 992-995. [Med. Lab. Weltevreden.]

With the technic described by HERM (see this *Bulletin* Vol. 24, p. 978) the author examined 103 samples of faeces 7 of which contained

no parasitic ova. In the other samples were eggs of *Trichocephalus*, *Ascaris*, *Ancylostoma* and *Clonorchis*. The same samples were examined with the eosin method and the comparative results as regards the time which elapsed before the first egg was found and the number of ova detected are given in tabular form. The cedar-oil method in approximately 90 per cent. of the cases gave better results than the eosin test. The eggs especially those of *Ancylostoma* are apt to undergo some alterations in the smears covered with cedar-oil therefore the smears ought to be examined within half an hour of their preparation.

W J Bais.

FISCHER (Walther) Ein unbekannter Parasit der Leber [An Unidentified Liver Parasite].—*Virchows Arch f Path Anat* 1928. July 28 Vol. 269 No 1 pp 162-165 With 3 text figs [Path. Inst Univ Rostock.]

The pathological reactions surrounding pieces of parasite with cuticular surface are illustrated and described but the zoological position of parasite cannot be determined.

R T L.

SHIRAI (Mitsui) The Biological Observation on the Cysts of *Fasciola hepatica* and the Route of Migration of Young Worms in the Final Host.—*Scientific Reports Govt. Inst Infect Dis Tokyo*. 1927 Vol. 6. pp 511-523 [7 refs.]

Laboratory studies upon the cercariae of *Fasciola hepatica* reveal some interesting and important facts. The cercariae on emerging from the snail are not infective before encystment and for a period of about 12 hours after encystment. The cyst can be kept alive for 80 days in fresh water at 22°-31° C. If dried in the shade at 25°-32° C. for 72 hours they ceased to be infective. In direct sunlight they survived drying for 3 hours at 35° C. or at 26° C. for 24 hours in the shade. Even if heated in water to 37° C. for 12 hours or 40° C. for 2 hours the cysts remained infective but kept at 45° C. for 30 minutes or 50° C. they were killed. In water at -21° C. the cysts perished within 10 minutes. But if kept in water at 0° C. for 24 hours but not frozen they remained infective. In various chemicals their resistance somewhat resembled that of *Paragonimus* cysts e.g. they survive in 50 per cent. alcohol for 2 hours in 0.8 per cent. formalin water solution for 24 hours and in 3 per cent. saline water for 24 hours.

Experiments confirm the previously observed facts that the cercariae do not migrate into the liver by the bile duct but enter by way of the abdominal cavity. In laboratory animals the flukes do not enter the bile ducts but wander in the liver parenchyme even after reaching maturity.

R. T. L.

PATTERSON (S W) A Case of Human Infestation with Liver Fluke.—*Lancet* 1928 Dec 22. pp 1291-1292. [9 refs.]

This case of human infection with *Fasciola hepatica* showed an eosinophilia of 42 to 62 per cent. There was fever irritating spasmodic cough

abdominal discomfort and severe colic at times. Treatment was by non-surgical biliary drainage with drachm doses of 50 per cent. magnesium sulphate twice weekly on an empty stomach, with increasing doses of hexamine with bicarbonate of soda and intravenous injections of stilbozol. The abdominal symptoms disappeared, the total leucocytes fell from 18,000 per cmm. to 8,000 the eosinophiles from 62 to 4 per cent., and the ova were found in the stools only on concentrating. The patient is now well.

R. T. L.

CHESTER (W. L.) *Fasciola hepatica*—a Fatal Case in a European Soldier.
—*Jl Roy Army Med. Corps* 1928. Dec. Vol. 51 No. 6 p. 483

An abstract is given from an old P.M. report of a case of fluke infestation in a 21-year-old soldier of the Dorset Regiment who had been stationed in Egypt in 1886. Over a dozen liver flukes were found in the bile ducts, which were dilated with thickened walls. The largest fluke measured 1 inch by $\frac{1}{2}$ inch. It was flat, oval, rather pointed at the head, blunt and rounded posteriorly. At the tip of the head was a small orifice and about one-eighth of an inch from this in the middle line an elevated orifice which "appeared to contain a red clot of blood." [The case is diagnosed as *Fasciola hepatica*, but is more probably *Fasciola aegyptiaca* = *F. sugalis*]

R. T. L.

BUTLER (J. Bayley) & BUCKLEY (J. J. C.) *Catenaria anguillulæ* as a Parasite of the Ova of *Fasciola hepatica*.—*Scient. Proc. Roy Dublin Soc.* 1928. Jan. Vol. 18. N.S. Nos. 43-47 pp. 407-513. With 45 figs. on 4 plates. [8 refs.]

Ova of *Fasciola hepatica* are attacked by a Chytridiacean parasite, *Catenaria anguillulæ*. The fungus is described and the possibility of using it as a means of checking the infection of snails by miracidia is suggested, for an infection of the egg destroys the miracidium.

R. T. L.

PIGULEWSKY (S. W.) Zwei Fälle von *Fasciola gigantica* Cob. beim Menschen in Russland. [Two Cases of *F. gigantica* Infestation in Man in Russia].—*Arch. f. Schiff- u. Trop. Hyg.* 1928. Oct. Vol. 32. No. 10 pp. 511-512. With 2 figs. [7 refs.] [Helminth. Lab. Trop. Dis. Station, Tashkent.]

In inhabitants of Tashkent nine cases of *Fasciola*, of which two are diagnosed as *Fasciola gigantica* were found during a systematic microscopical examination of stools. The eggs measured in one case 0.160-0.195 mm. by 0.07-0.096 mm. In the second case 0.155-0.19 by 0.075-0.09 mm. This species has, according to the author been recorded previously from man by GOUVEA in Rio de Janeiro 1865.

R. T. L.

TUBANGUI (Marcos A.) Larval Trematodes from Philippine Snails.—*Philippine J. Sci.* 1928. May Vol. 36. No 1 pp 37-54 With 5 plates. [4 refs.] [College of Vet. Sci. Univ. of the Philippines Los Baños.]

— Trematode Parasites of Philippine Vertebrates.—*Ibid* July No 3 pp. 351-371 With 5 plates. [17 refs.] [Univ. of the Philippines Los Baños.]

The second paper deals with trematode parasites of representative Philippine vertebrate hosts other than man and domesticated animals and the first paper describes for the first time the trematode larvae which occur in certain widespread freshwater snails viz. *Melania* sp. *M. asperata philippinensis* and *Ampularia lagimaensis*. No cercaria occurred in *Vivipara angularis*. Nine different larval flukes were discovered and are given new names.

R. T. L.

OCHI (Shigeru) [A Contribution to the Study of the Trematodes, which infest the Fresh Water Fishes as their Intermediate Host. On a Species of Encysted Larvae found in *Leuciscus hakonensis*].—*Tokyo Iji Shinshi* (*Tokyo Med News*) 1928 Sept. No 2588 [Summarized in *Japan Med World* 1928 Dec 15 Vol. 8 No 12, p 326]

Encysted cercariae of *Metagonimus yokogawai* occur in *Leuciscus hakonensis* a fresh water fish commonly known in Japan as Ugui. The adult worms were experimentally reared in puppies and albino rats

R. T. L.

HIRAHAWA (Ichiro) On *Echinochasmus perfoliatus* found Parasitic in Man and on the Final Host of this Parasite.—*Tokyo Iji-Shinshi* (*Tokyo Med News*) 1928 June No 2577 [Summarized in *Japan Med World* 1928. Oct. 15 Vol. 8. No 10 p 275]

A natural infection of man with the small fluke *Echinochasmus perfoliatus* is recorded. It also occurred as a natural infection in a water bird named "goisagi."

R. T. L.

BLACKMORE (H. S.) Preliminary Note on the Sterilization of Bilharzia-Infected Water.—*Jl Roy Army Med. Corps* 1928. Oct Vol 51 No. 4 pp. 262-264

Chloramine has proved so successful in sterilizing drinking water that it has been tested as a method of purifying bilharzia-infected waters. *Planorbis bossyi* were collected which discharged cercariae resembling morphologically those described as schistosome cercariae. Exposure to a dilution corresponding to one part per million of available chlorine caused immediately greatly increased activity followed by complete cessation within about five minutes. These results were controlled by the use of bleach solution as controlled by the use of Horrocks apparatus. The cercariae all died within twenty minutes loss of mobility being taken as evidence of death. A third experiment was designed which again showed the extreme susceptibility of cercariae to free chlorine. The cercariae were dead in under five minutes and had been killed by less than the proportion of chlorine which would be employed for disinfection in the ordinary way

R. T. L.

abdominal discomfort and severe colic at times. Treatment was by non-surgical biliary drainage with drachm doses of 50 per cent. magnesium sulphate twice weekly on an empty stomach, with increasing doses of benamine with bicarbonate of soda and intravenous injections of stilbena. The abdominal symptoms disappeared, the total leucocytes fell from 18,000 per cmm. to 8,000 the eosinophiles from 62 to 4 per cent., and the ova were found in the stools only on concentrating. The patient is now well.

R. T. L.

CHRYSTEN (W. L.) *Fasciola hepatica* a Fatal Case in a European Soldier.
—*Jl Roy Army Med. Corps* 1922. Dec. Vol. 51 No. 6 p. 463

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R. T. L.

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R. T. L.

TALLAFERRO (William H.) HOFFMAN (William A.) & COOK (Donald H.)
A Precipitin Test in Intestinal Schistosomiasis (*S. mansoni*)—
Porto Rico Rev of Public Health & Trop Med. 1928 Sept.
 Vol. 4 No 3. pp. 117-119 [School of Trop. Med. Univ
 Porto Rico.]

Four different methods were tested for the preparation of a specific antigen for the diagnosis of *Schistosoma mansoni* infections. The most satisfactory was a concentration of schistosome larvae obtained by centrifugation of macerated infected snail livers. The larvae are ground and then extracted with ether or absolute alcohol and the lipid-free residue is subsequently extracted with Coca's solution containing 0.05 per cent. NaHCO_3 . The clear supernatant fluid is used as the antigen. With this pseudopositives with syphilitic sera were not encountered.

R. T. L.

MRYAJI (S.) & IMAI (B.) Serologische Studien bei Schistosomiasis japonica. [Serological Studies with *Schistosoma japonicum*.]—
Cent f Bakt I Abt. Orig 1928. Vol. 106. pp. 237-246.
 With 3 charts in text. [5 refs.] [Bact. Inst. Med. Faculty Niigata, Japan.]

These authors injected rabbits with an emulsion of schistosomes and were able to show that such injection stimulated the production of complement fixing bodies and precipitins for schistosomes in the sera of the experimental animals. Infection of rabbits and dogs with schistosome cercariae also produced these reactions. The *in vitro* studies were more satisfactory when saline extracts were used as antigens as alcoholic extracts sometimes gave a reaction with Wassermann positive sera. The sera of apparently healthy persons living in an area where schistosomiasis is endemic, but in whose faeces schistosome eggs were not found, often gave a positive reaction. They also showed that when rabbits which had previously been injected with an emulsion of *Bact typhosum* were infected with schistosome emulsion or cercariae the agglutination titre for *Bact typhosum* tended to rise again.

R. Lovell

IMAI (Bunji) [A Contribution to the Serological Reaction of *Schistosomiasis japonicus*]—*Iri-Shimbun (Med News)* 1928 June No 1238
 [Summarized in *Japan Med World* 1928 Oct. 15 Vol 8.
 No 10 p 273]

Phenolized saline extracts of *Schistosoma japonicum* adults gave about 100 per cent. positive complement fixation reaction with infected persons sera which had been proved to be almost reliable as the specific reaction. The precipitation reaction occurred in about 50 per cent. Alcoholic extracts of the adults and of the intermediate hosts were also tested [but the English summary does not indicate the outcome]

R. T. L.

TODOKORO (K.) History of Japanese Schistosomiasis (Katayama Disease) and its Prevention in Hiroshima Prefecture.—*Jl Pub. Health Assoc Japan* 1928. Sept. Vol. 4 No 9 pp 1-9

A brief account is given of the history of schistosomiasis in the Hiroshima prefecture and of the activities of the work of the Association for the suppression of local diseases. Its principal activities were

concerned with the extermination of intermediate hosts, the installation of pit latrines and the replacement of horses for cattle in ploughing. Wild rats were repressed and the inhabitants were warned against skin infection from immersion in water. As a result "kabure" due to skin invasion has decreased. There has been a marked drop in the infection of cattle and in the numbers of the intermediate host. Very few of the inhabitants are infected with hookworms or roundworms, and it is suggested that possibly the use of lime against the intermediate hosts of the schistosome has also effectively destroyed the eggs of these parasites.

R. T. L.

OZAWA (Makoto) Clinical, Histological and Statistical Observations on *Schistosomiasis japonica* as a Cause of Acute Appendicitis.—*Japan Jl. Experim. Med.* 1928. Nov. 10. Vol. 7. No. 1 pp. 95-99. [15 refs.]

Between 1923 and 1927 the author studied 54 appendices obtained from patients in the Yamanashi prefecture of Japan, where *S. japonicum* infection is very prevalent. 42 cases upon which the author operated, were diagnosed clinically as acute or chronic appendicitis and in 20 of these cases eggs of *S. japonicum* were found in the wall of the vermiform process. In another group of 12 cases which had not had appendicitis the author removed the appendix prophylactically and in 7 of these eggs of *S. japonicum* were also found on histological examination. While *S. japonicum* cannot be said to induce acute appendicitis by itself, the special histological changes associated with the presence of the eggs induces an increased invasion of bacteria and leads to secondary infection resulting in the possible occurrence of an acute appendicitis. Where *S. japonicum* is endemic appendicitis is much more prevalent than in the non-endemic regions of Japan.

R. T. L.

LIU (H. L.) A Case of *Schistosomiasis japonica* complicated with Amoebic Dysentery.—*Nat. Med. Jl. China* 1929 Feb. Vol. 15. No. 1 pp. 47-48.

A case of *S. japonicum* infestation is recorded as the first to occur in the Luchowfu Christian Hospital, Hokei, Anhwei. A course of emetics caused the amoeba and cysts to disappear from the stools in four days. The schistosome ova persisted, but these disappeared on the 18th day after tartar emetic treatment was instituted.

R. T. L.

WARD (H. B.) Studies on the Broad Fish Tapeworm in Minnesota.—*Jl. Amer. Med. Assoc.* 1929 Feb. 2. Vol. 92. No. 5 pp. 389-390. [6 refs.]

Nine species of fish taken from five different lakes in the north-eastern part of the State of Minnesota were examined for larval stages of *D. latum*. In three species only were larvae found, viz. in *Esox lucius*, *Stizostedion vitreum* and *Perca flavescens*. These occurred in Burnside Lake, Fall Lake and Long Lake. Dogs were readily infected, but young

kittens and full-grown cats and guineapigs proved resistant. The form recorded by HALL and WIGDOR as *D. americanus* found in the dog in Detroit may only be a juvenile form of *D. latus* as with *D. minor*. Ward's own records show that *D. latus* infests freshwater fish from New England to Alaska, but the records are too scanty and too scattered to give any idea of the real frequency of their occurrence.

R. T. L.

WARTHIN (Aldred Scott) Increasing Human Incidence of Broad Tapeworm Infestation in Great Lakes Region.—*Jl Amer Med Assoc.* 1928. June 30 Vol. 90 No 26. pp. 2080-2082. [4 refs.]

During the last five years the great majority of persons with *D. latus* who have been examined by the Pathological Laboratory of the University of Michigan have come from the southern part of the State particularly from Detroit and have been Jews. These patients were all fish-eaters most of them stating that they preferred uncooked fish. These cases have all presented clinically a more or less severe anaemia, usually a secondary anaemia, but in a few cases suggesting strongly a pernicious anaemia. In the majority of cases the patients had live worms. Two cases are cited in detail.

R. T. L.

VERGEER (Teunis) New Sources of Broad Tapeworm Infestations Report of Fourteenth Native Case.—*Jl Amer Med Assoc.* 1928. Aug 11 Vol. 91 No 6. pp 396-397 [2 refs.] [Dept. Zool. Univ Michigan.]

Three new cases of human infestation with *Dibothriocephalus latus* have recently come under the author's notice in Michigan making a total of 14 known native cases. Of these 8 were of Jewish parentage 13 of the patients were under 11 years of age. Since the author's report of plerocercoids in fish from Lake Winnipeg they have also been found in fish from most of the commercially important Canadian lakes.

R. T. L.

VERGEER (Teunis) Dissemination of the Broad Tapeworm by Wild Carnivora.—*Canadian Med Assoc Jl* 1928. Dec. Vol. 19 No 6. pp. 692-694 [12 refs.] [Dept. Zool. Univ of Michigan, Ann Arbor Mich.]

In the northern lake regions of Alberta, Manitoba and Ontario the dog is an important reservoir of *D. latus* in man. The fox, cat, wolf, coyote and lynx are also capable of serving as hosts. Bears are common in the infested territories and catch and eat fish during the spawning seasons. Two bears were successfully infected experimentally. As wild carnivores are natural reservoirs the infestation of fish cannot be completely controlled by man.

R. T. L.

VERGEER (Tunis) The Broad Tapeworm in America with Suggestions for its Control.—*Jl. Infect Dis.* 1929. Jan. Vol. 44 No. 1. pp. 1-11 With 1 text fig & 17 figs. on 2 plates. [36 refs.] [Dept. of Zool. Univ. of Michigan, Ann Arbor Michigan.]

Owing to the difficulty of distinguishing the plerocercoid larvae of Pseudophyllidean cestodes the author stresses the importance of feeding experiments as a means of identification. He does not accept NICHOLSON'S statement that perch and trout are sources of infection in America, as he has found no evidence in its support. Plerocercoids are most often found in the flesh. They appear to grow larger in *Stizostedion* than in *Esox*. Segmentation is absent in the plerocercoid. Several other species of larval tapeworm also occur in the flesh. Those of the genus *Proteocephalus* are distinguished by their four or five cup-shaped suckers. Plerocercoids of *Dibothrium cordiceps* in the flesh of trout closely resemble the larvae of *D. latum*. In shipments from every important Canadian lake the author has found fish containing the larvae of *D. latum*. These lakes supply nearly 80 per cent. of the total consumption of *Stizostedion vitreum* in the United States and this export constitutes 83 per cent. of the total Canadian catch. The legal exclusion of Canadian fish from the United States would in the author's opinion reduce the tapeworm menace by at least 80 per cent., but an important industry would be ruined. Only about 500 cases have so far been reported in the United States. Prophylactic measures comprise publicity, sewage control and treatment of infected persons. It is recognized that dogs, foxes, otters, bears and cats may serve as natural carriers.

R. T. L.

VERGEER (Tunis) The Dog as a Reservoir of the Broad Tapeworm.—*Jl. Amer. Med. Assoc.* 1929. Feb. 23. Vol. 92. No. 8. pp. 607-608. [8 refs.] [Zool. Lab. Univ. Michigan.]

Nearly 80 per cent. of the fishes *Stizostedion vitreum* and of the great northern pike *Esox lucius* which are consumed in the United States are imported from the large lakes of Ontario, Manitoba and Alberta. Lake Nipigon in Ontario is especially heavily infected. The worms have been introduced from Europe originally by infested Scandinavian, Finnish and Russian immigrants engaged on lumbering. The fish have become infected and have then infected the dogs especially those in the Indian reservations.

R. T. L.

LEIPER (R. T.) A Cryptic Infection with *Dibothriocephalus latum*.—*Jl. Helminthology* 1928. Dec. Vol. 6. No. 4. pp. 223-228. With 1 text fig.

The later history is given of a case of experimental infection of man recorded by Mies LE HAS in 1924. No anaemia has resulted from an infection with *D. latum* extending over a period of five years while the blood picture has reverted to normal [see this *Bulletin* Vol. 22, p. 475].

R. T. L.

MAGATH (Thomas B.) **Experimental Studies on *Diphyllobothrium latum*.**—*Amer. J. Trop. Med.* 1929 Jan. Vol. 9 No 1 pp 17-48 With 23 figs. [37 refs.] [Mayo Clinic Rochester Minnesota.]

Many foreign proteins and lipoids will induce anaemia experimentally in certain animals and there is little reason to suppose from the results of injection of extracts of *D. latum* that more than secondary anaemia is induced. Certainly the typical picture of pernicious anaemia is not produced. Extract of ascaris will similarly induce a secondary anaemia but ascariasis and pernicious anaemia occur so rarely together that no direct causal relationship between them can be inferred. The author concludes from a critical analysis that it is by no means clear that the association of a severe grade of anaemia with *Dibothriocephalus* infestation is one of cause and effect. Records of the feeding of larvae from North American fishes to dogs are tabulated. The author is of opinion that *D. parvus* Stephens is identical with young adult *D. latum* collected before any segments have sloughed off. Wall-eyed pike from Lake Winnipeg have a high percentage of infestation. It is interesting to note that Finnish families did not appear in Winnipeg until within the last half decade or decades. Jews first appeared in numbers in 1880 and came from Russia. Since Jewish women in the regions of Russia and Rumania from which Jews have migrated to Winnipeg so commonly harbour *D. latum* it is quite likely that they have formed the present endemic region. The control of the infestation is of considerable concern and the author has recommended that it should be notifiable and that a survey of the lakes in Minnesota should be made to determine the degree of infestation in fish, that raw sewage should not be passed into the lakes and that publicity should teach people to cook fish well before consuming it.

R. T. L.

FAUST (E. C.) **Infection Experiments in Man and other Mammalian Hosts with Sparganum Stage of Oriental Diphyllobothrids.**—*Proc. Soc. Experm. Biol. & Med.* 1928. Dec. Vol. 26. No. 3 pp 252-254 [2 refs.] [College of Med. Tulane Univ Louisiana.]

A series of experiments with spargana collected in China shows that these larvae hitherto regarded as belonging to *Sparganum mansoni* really belong to several distinct species. The cat, dog and their wild relatives are the natural hosts of the adult worms and except with *D. houghtoni* a new species man is not subject to infection with the adult. Evidence, not yet conclusive favours the view that the application of frogs to inflamed and ulcerated parts of the body is the source of sparganosis in man.

R. T. L.

LI (Chi-Hueh) & FAUST (E. C.) **Infection of Cyclops with Cercarial Stage of Oriental Diphyllobothrids and their Development to Mature Proceroid Stage.**—*Proc. Soc. Experm. Biol. & Med.* 1928. Dec. Vol. 26 No 3 pp. 250-251 [2 refs.] [Peking Union Med. College Peking & College of Med. Tulane Univ Louisiana.]

Eight species of Cyclops obtained in considerable numbers in the neighbourhood of Peking were all found to be susceptible to infection

with the coracodia, or ciliated hexacanth embryos of *Dibothriocephalus* 25 minutes or longer were occupied by the oncospheres in excavating their way through the gut wall of the Cyclops after ingestion. Certain small species of Cyclops harboured larger numbers of mature procercoids than the larger forms.

R. T. L.

RICHTER (Oscar) MAURER (Siegfried) & EYL (Mary) Treatment of Severe *Dibothriocephalus latus* Anemia, with a High Caloric Diet, Rich in Liver Extract and Vitamins.—*Jl. Amer. Med. Assoc.* 1928. Nov. 10 Vol. 91 No. 19 pp. 1462-1463. With 1 text fig. [5 refs.] [Otho S. A. Sprague Memorial Inst. & Dept. of Path. Univ. Chicago & Cook County Hosp. Chicago.]

An interesting feature of this case of successful treatment of *Dibothriocephalus* anemia with a high caloric diet rich in liver extract and vitamins was the fact that the moribund condition of the patient, a young Finnish woman aged 24 when first seen, contraindicated anthelmintic treatment. Such treatment was instituted with success after dietetic management had resulted in improvement of her condition.

R. T. L.

ISAACS (Raphael) STURGIS (Cyrus C.) & SMITH (Millard) Tapeworm Anemia. Therapeutic Observations.—*Arch. Intern. Med.* 1928. Sept. Vol. 42 No. 3 pp. 313-321 With 3 figs. [12 refs.] [Thomas Henry Simpson Memorial Inst. for Med. Research, Univ. of Michigan, Ann Arbor Mich.]

As MIXOT and MURPHY have shown that the blood of patients with pernicious anemia could be restored to normal when half a pound of liver was eaten daily this regime was tried on a patient having a marked anemia and a *Dibothriocephalus latus* infection. The symptoms disappeared, even though the parasite was not removed. No evidence of the presence of soluble toxins was obtained by the application of intradermal tests with saline suspensions of the tapeworm.

R. T. L.

MILLER, Jr (Harry M.) & DAWLEY (Charlotte W.) An Experimental Study of some Effects of *Cysticercus fasciolaris* Rudl. on the White Rat.—*Jl. Parasit.* 1928. Dec. Vol. 15. No. 2 pp. 87-103. With 4 text figs. & 3 figs. on 1 plate. [15 refs.]

Experimental infections of white rats with *Cysticercus fasciolaris* show that even in the extremely heavy infestations the chief effect seems to be a mechanical one, the enormously distended liver pressing on the viscera and the function of the liver itself being affected by the cysts. Anaphylaxis was never obtained even after repeated puncture of the cysts. The cyst fluid appeared to have no toxicity. The only definite effect was an increase in the eosinophiles, which remained at a high level for about two weeks within a fortnight after infection in light cases. In heavily infested animals the degree of eosinophilia was little more. All the evidence points to the fact that the tapeworm and host are very highly adapted to each other.

R. T. L.

STEINERT (Kurt) Zur Serodiagnostik der Echinokokkuskrankheit beim Menschen. [The Serological Diagnosis of Echinococcal Infection in Man.]—*Muench Med. Woch.* 1928. Mar 2. Vol. 75 No. 9 pp 389-392. [15 refs.]

BLUMENTHAL (G.) Zur Serodiagnostik der Echinokokkuskrankheit beim Menschen. Bemerkungen zu der gleichnamigen Arbeit von K. Steinert in Nr 9 d. Wschr.—*Ibid* Apr 20 No 16. p. 697 [Robert Koch Inst. Berlin.]

This is a report of the examination for echinococcal infection of the sera of 56 people by means of the complement fixation test. Various antigens from sheep pigs and horses were used the most satisfactory appearing to be the fluid and membrane from echinococcal cysts, preserved with phenol. Of the 56 examined, 11 were positive and of these echinococcal infection was proved in 6 cases. An operation was not possible in 4 and in the remaining case a *Cysticercus cellulosae* was discovered. This suggested a Group' reaction as the complement fixation test had proved positive with an echinococcal antigen. The author concludes that the complement fixation test is a reliable method for the establishment of echinococcal infection

R. Lovell

SACHS (H.) & KLOPSTOCK (A.) Beiträge zum serologischen Verhalten der Bandwurmlipide [The Serological Behaviour of Tape Worm Lipoids].—*Ztschr f Immunitätsf u Experim. Therap* 1928. Mar 27 Vol. 55 No 3-4 pp. 341-357 [4 refs.] [Cancer Research Inst. Heidelberg]

Complement fixation tests carried out with the serum of experimental rabbits showed that animals injected with a watery extract of tape worms produced lipid antibodies thereby confirming the work of MEYER. Rabbits injected with alcoholic extracts alone produced no reaction but alcoholic extracts with the addition of swine serum produced lipid antibodies. When *in vitro* experiments were carried out fixation of complement took place when either watery or alcoholic extracts were used as antigens if the tubes were incubated at 37° C. but fixation took place only with the alcoholic extracts at 0 C.

The serum from animals injected with alcoholic extracts and swine serum not only fixed complement in the presence of alcoholic extracts, but also with extracts of normal animal organs but not with lecithin, the reaction being thereby similar to a Wassermann reaction. On the other hand, lecithin antiserum with either lecithin tape worm extracts or certain organ extracts as antigens was able to fix complement.

The serum produced by the injection of watery extracts appears to be specific, and it is concluded that the tape worm body-substance contains not only specific but also undifferentiated lipid antigens.

R. Lovell

BOTTERI (Johann Hugo) Echinokokkenantigen. [Echinococcus Antigens].—*Klin. Woch.* 1929 Apr 30 Vol. 8. No 18. pp 836-839 [11 refs.]

Some of the conflicting results of testing for hydatid infection may be due to the fact that the fluid used as antigen contains several

substances other than the protein constituent namely peptone polypeptides amino-acids, lipoids and polysaccharides.

When the cutaneous inoculation is made two reactions are set up, an early one showing itself in 5-10 minutes and a late which should be observed after 24 hours. It is the latter only which is to be regarded as specific. A positive early but negative late reaction has been seen in conditions other than hydatid infection, for example, lupus vulgaris, scrofula, and trichophyton. Albumen-free antigens, whether of human or animal origin, may give rise to sensitizing allergic reactions but not to symptoms of anaphylaxis. The early response is due to split products thrown out by alcohol and to polypeptides and amino-acids soluble in alcohol which diffuse through the cyst-membrane *in vivo*. The delayed reaction, the specific local oedema, is a true anaphylactic phenomenon a protein allergy due *in vivo* to damage of the cyst-wall resulting from the age of the parasite. In the complement-fixation reaction it is the lipid fraction which reacts analogous to the Wassermann reaction in syphilis. In the cut-reaction mainly the protein fraction.

H. Harold Scott.

STUART (Harold C.) & ACQUISTE (Donald L.) *Dipylidium caninum* Infection in an Infant Six Months of Age. Report of a Case.—*Amer Jt Dis. Children* 1928. Sept. Vol. 36. No. 3. pp. 523-525. * reb. Med. School Harvard Univ. Boston, Mass.]

Segments of *Dipylidium caninum* were passed by an infant 6 months old. As it seemed unlikely that the normal adult dose of an anthelmintic proportioned down for so young an infant could successfully remove the worm no treatment was given. It is presumed that the case was a local one in Boston, U. S. A., but the report does not state so.]

R. T. L.

HOFFMAN (W. H.) Case of Human Infestation by a Dog Tapeworm. — *Porto Rico Rpt. of Public Health & Trop. Med.* 1928. July. Vol. 4. No. 1. p. 46. [School of Trop. Med., Univ. Porto Rico.]

Segments of *Dipylidium caninum* occurred in the stools of a male patient of Dr. JOSE S. BELVAL. No symptoms were attributable to the infection. The case is the first to be recorded for Porto Rico.

R. T. L.

SCHAPIR (M. M.) [Transduodenal Expulsion of Tapeworm.]—*Khrizchskaya Meditsina*. Moscow. 1928. June. Vol. 6. p. 634. [Summarized in *Jt Amer Med Assoc* 1928. Sept. 15. Vol. 91. No. 11. p. 843.

From the American summary this paper appears to be an account of the use of the duodenal tube as a means of introducing an anthelmintic for the treatment of tapeworm [species not stated]. The worm was usually expelled in two to two and a half hours. An hour and a half after introduction of the anthelmintic irrigation was performed with physiological saline solution unless the worm had been expelled already.

R. T. L.

DE LANGEN (C. D.) Anguillulosis en het ziektebeeld van de Idiopathische Hypereosinophilie. [*Strongyloidosis and "Idiopathic Hypereosinophilia."*—*Geneesk. Tijdschr v Nederl Indië* 1928. Vol. 68. No 7 pp 973-990 [2 refs.]

In 1923 the author together with MOH. DJAMIL (see this *Bulletin* Vol. 21 p 409) described a peculiar disease which they called idiopathic hypereosinophilia, the etiology of which they could not indicate and which they considered to be caused by abnormal function of the bone marrow. The same clinical picture has been noticed by others and the author has seen 16 cases since his previous publication. The principal symptoms are a peculiarly high eosinophilia, slight anaemia, pain and oppression in the upper abdomen, intermittent diarrhoea, slight rises of temperature and pulmonary symptoms of an asthmatic character.

After the author's attention had been drawn to the presence of *Strongyloides stercoralis* in the faeces of his patients 12 out of the 16 cases mentioned (all with hypereosinophilia of over 40 per cent.) could be examined in this respect and all were found to carry the worm. Another 14 patients suffering from other diseases but also infected with *strongyloides* showed slight degrees of hypereosinophilia (3-29 per cent.) The clinical symptoms as well as the hyper-eosinophilia subside after the expelling of the worms which may be attained by means of a combined simultaneous course of intravenous injections of tartar emetic (total dosage per cure never over 2.5 gm.) and of gentian violet administered orally in doses of 100-300 mgm in powders 3-5 times per day with some intermissions of a few days in the course of the cure. This cure can be carried out without untoward effects.

W. J. Bais.

YAMADA (Shin Ichiro) An Experimental Study on Twenty-four Species of Japanese Mosquitoes regarding their Suitability as Intermediate Hosts for *Filaria bancrofti* Cobbold.—*Scientific Reports Gov. Inst. Infect Dis* Tokyo. 1927 Vol. 6 pp 559-622. With 3 plates. [62 refs.]

Hitherto more than 40 species of mosquitoes have been investigated by various workers, and of these only six have been proved efficient carriers of *Filaria bancrofti*. Partial development has been noted in 19 species. In this paper Yamada records the results of a study of 24 Japanese mosquitoes. He notes that there are seven of these in which complete filarial development occurs. All of these are commonly found in human habitations in Japan. None of the wild species proved suitable intermediate hosts. The paper gives also a useful summary of the developmental phases of *Filaria bancrofti* in the intermediate host. These are well illustrated upon three plates.

R. T. L.

KIRK (J. Balfour) The Incidence of Filariasis in Port Louis, Mauritius.—*Trans Roy Soc Trop Med & Hyg* 1928. Nov 25 Vol. 22. No 3 pp 263-268 [4 refs.]

The resident population of the city and district of Port Louis the capital of Mauritius numbers about 54 000 mostly of a humble status in life and of African or Asiatic origin. Of these about 23 000 are

Indians. The climate is equable and warm, showing little seasonal variation. Blood films were taken between August and September 1927 and examined for filarial embryos. In 858 persons the infection rate was 11.2 per cent. The embryos were those of *Filaria bancrofti*. A table is given setting out the age incidence in groups. None of the children under five years of age was infected. In the older groups the males generally gave a higher infection rate than the females. The author points out that this is contrary to expectation if the transmitting agent is a domestic mosquito. The relation of epitrochlear gland enlargement to filarial infection was investigated, but neither this nor other physical sign proved a reliable early indication of filarial infection. In Port Louis the infection is a benign one. Of 37 males of the positive cases 15 had enlarged glands, 3 hydrocele and 1 each had acute lymphangitis, abscess, varix, lymph scrotum orchitis, fever. 19 were without clinical signs. There was no case of chyluria or elephantiasis. In 76 males, in which the blood was negative, 49 had enlarged glands, 9 had abscess, 11 had hydrocele, 6 orchitis, 1 fever and 4 elephantiasis. None had chyluria. The local vector *Culex fatigans* was ascertained 28 years ago by d'Emmerex DE CHAMON.

R. T. L.

KOMKE (Vishnu T). Observations on Filariasis in some Areas in British India. Part III.—*Indian J. Med. Res.* 1929. Jan. Vol. 16. No. 3. pp. 695-715. With 1 map in text. [2 refs.] Central Research Inst. Kasauli.]

In Bihar and Orissa embryos occurred in the blood of 14 per cent. of the general population and the infection would appear to be uniformly distributed throughout the area, which is chiefly one in which paddy is cultivated. Useful information regarding the density of population in the various areas studied is given and the prevailing mosquitoes have been identified. Little or no infection occurred in the sub-montane and plateau areas. At sea level the infection reached the highest incidence. In the valley of the Ganges the greatest incidence occurred where water for irrigation was plentiful. Of cases suspected of filariasis on clinical grounds 15 per cent. showed embryos in the blood and 12 per cent. did not. Where filariasis was not suspected on clinical grounds embryos occurred in 14 per cent. A notable feature was the frequency of affection of the genitals in the areas above sea level and of the lower extremity in the areas at sea level. 8.3 per cent. of mosquitoes, of unidentified species, showed developmental stages in the Balasore area.

R. T. L.

HOFFMAN (Wm. A.) MARÍN (R. A.) & BURKE (Alice M. B.). Filariasis in Porto Rico. I. Progress Report on General Survey.—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Sept. Vol. 4. No. 3. pp. 120-127. With 1 map. [School of Trop. Med. Univ. Porto Rico.]

The only filarial infection in man in the island of Porto Rico is *Filaria bancrofti*. It occurs to a greater extent on the moist coastal areas than elsewhere but is to be found in many districts. The infection rate varied from 0.42 per cent. to 13.04 per cent. with an average of 5.11 per cent. in 3,857 persons examined.

R. T. L.

- BURKE (Alice M. B.) *Filariasis in Porto Rico. II. Notes on Family Incidence and Clinical Manifestations.*—*Porto Rico Rev of Public Health & Trop Med.* 1928. Oct. Vol. 4 No 4 pp. 169-178. [3 refs.] [School of Trop Med. Univ Porto Rico]

Two filarial districts in Porto Rico have been studied with special reference to the family relationship of infected persons. In many households only a single person was found with embryos in the blood in spite of apparently optimum conditions for the spread of infection. No striking tendency to spread in families was noticed. In 33 families in which one member had elephantiasis a second member showed other evidence of filarial infection in 18 instances. Not one out of 59 cases of elephantiasis showed microfilaria in the blood, while of 20 cases which had microfilariae only 2 had any symptoms. The total number of persons examined during the survey was 248.

R T L

- NAPLESTONE (P. A.) *A Re-Description of Wuchereria bancrofti (Cobbold, 1877) with Special Reference to the Tail of the Male.*—*Indian Jl Med. Res* 1929 Jan. Vol. 16 No 3 pp 683-686. With 2 plates. [5 refs.] [School of Trop. Med. & Hyg Calcutta.]

Except for differences in the tail of the male the anatomy of the *Filaria bancrofti* worms described by various observers is very similar and the differences noted may be due to variation. The author agrees that the examination of the tail characters is one of great difficulty partly on account of natural coiling and partly due to transparency. In the two male specimens described all that could be made out with certainty in one were two pairs of minute papillae towards the tip of the tail and a single pair of broad adanal papillae. Other papillae if present were very shadowy and could not be definitely determined. In alcohol it appeared that there was a narrow caudal ala on each side supported by nine pedunculated papillae. In the second specimen the only papillae observed were 3 indefinite pre-anal and 2 post-anal papillae these however did not appear pedunculated and the caudal alae could not be made out.

R. T L

- RAO (S. Sundar) *Occurrence of Chyluria after Confinement.*—*Indian Med. Gaz.* 1929 Feb Vol. 64 No. 2 pp. 87-88. [2 refs.] [Calcutta School of Trop. Med. Calcutta.]

Records of chyluria in India are very scanty. A case is described in which the onset of chyluria followed confinement and was due to relaxation of pressure as well as to the strain of the confinement which caused the dilatation and rupture of the lymphatics in all probability. The blood of the newborn child showed no filarial embryos. Nor did the mother's milk, although there was a heavy incidence of microfilariae in the blood.

R. T L

DATTA (Subodh) *Microfilaria* in Hydrocele Fluid.—*Calcutta Med. J.* 1928. Sept. Vol. 23. No. 3. pp. 134-135.

A case of double hydrocele is described in which there was no available history of any illness suggestive of filarial infection prior to the discovery of microfilariae in the hydrocele fluid. The author says "I have not been able to trace any case report showing microfilaria in hydrocele fluid."

R. T. L.

BRUG (S. L.) *Filaria* in Ned. Indië. [*Filaria* in the Dutch East Indies].—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68. No. 5. pp. 681-704. With 4 figs. on 1 plate & 9 text figs. [49 refs.]

Brug gives a detailed description of *Microfilaria malayi*. A preliminary note appeared previously (see this *Bulletin* Vol. 25 p. 471). For practical parasitological purposes the differential diagnosis is best founded upon the following characteristics which *Mf. malayi* shows against *Mf. bancrofti*: (1) The presence of 2 or 3 scattered nuclei in the point of the tail, (2) the clear visibility of the anal pore, (3) the nuclei are situated close together and cover each other in the microscopic picture.

In tabular form the author presents a review of what is known about the occurrence of filariasis in the Dutch East Indies. The distribution is very irregular and still insufficiently known.

Elephantiasis is common enough, the reports do not often mention lymphangitis, though it is likely that this symptom often precedes the elephantiasis and locally may seriously interfere with the general state of health of the population.

To which of the two species of *Filaria*, now known to exist in the Dutch East Indies, the clinical manifestations are to be ascribed is not yet established. Probably both species play a part outside Java possibly *F. malayi* preponderates. Further research is necessary to throw more light on this and other problems e.g. the question which insect is the carrier, the relation between the number of *Mf. malayi* in day and night blood, and whether this relation is reversible by change of life habits, as in *Mf. bancrofti*. The adult *Filaria malayi* has also still to be discovered.

W. J. Bals.

WADA (Kaoru) The Experimental Treatment of Dog Filariasis with the Antimony Preparation (Neostibnal).—*Scientific Reports Govt. Inst. Infect. Dis. Tokyo*. 1927. Vol. 6. pp. 525-532. [11 refs.]

When neostibnal is injected intravenously into dogs suffering from *Filaria immitis* infection the filarial larvae disappear after a dose of 0.011 gm. per kilo of body weight has been repeated from 10 to 20 times. It is sometimes possible also to kill the adult worms in the heart cavity. Details of 7 experiments are given.

R. T. L.

OH (Han Young) *Filariasis in Korea.*—*China Med J* 1929 Jan. Vol. 43 No 1 pp 16-21 With 1 map in text.

Out of 24 cases of filariasis in Koreans 12 showed no symptoms and the infection was discovered only in the course of routine blood examinations. 4 cases of elephantiasis showed no evidence of filarial infection while in one case embryos were found. In four of the 24 cases the microfilariae had no sheath and there was no periodicity in their appearance in the peripheral blood. They were never present in large numbers. On these grounds the author records these embryos as *Filaria perstans*

R. T. L.

FUJISAKI (T) *An Abnormal Case of Filariasis.*—*Taiwan Igakkai Zasshi (Jl Med Assoc Formosa)* 1928 Oct. No 283 English summary p 71 [In Japanese] [Army Med School, Tokyo Japan]

Although filaria is reputed to be very rare in Taihoku a filaria adult was found in sections of a nodule removed from the right spermatic cord of a local soldier. No embryos occurred in the blood

R. T. L.

MYA (Tha) *Cerebral Symptoms associated with Filaria.*—*Indian Med Gaz* 1928 Nov Vol. 63 No 11 pp 636-637

A detailed history is given of a patient admitted to hospital for unconsciousness of 4 hours duration. Lumbar puncture was performed and the fluid which squirted out under pressure was bloody. The case ended fatally. The laboratory report stated that filarial larvae were found in the fluid. No other micro-organisms were present.

R. T. L.

MACKENZIE (Ridley) *A Case of Chyluria due to Filaria bancrofti with Lymph Varix in the Bladder Wall.*—*Canadian Med Assoc J* 1928 Oct. Vol. 19 No 4 pp 458-459 [4 refs] [Women's General Hosp Montreal]

Filariasis is rarely seen in Canada and is always of exotic origin. The brief account given of a case in a native of Barbados contains nothing of special interest

R. T. L.

YOUNG (W. A.) *Two Cases of Extra Peritoneal Abscess attributed to Filariasis.*—*Zanzibar Protectorate Ann Rep on the Med San & Biol Divisions for Year 1927* Section IX pp 82-83

Two cases are described in which there were very extensive abscess cavities from which several pints of creamy pus were evacuated.

R. T. L.

COHEN (A. J.) *Filaria medinensis.*—*Geneesk. Tijdschr v Nederl. Indië* 1929 Jan. 21 Vol. 69 No 1 pp 55-58. With 2 figs. on 1 plate.

Cohen describes the case of an Arab in whom four guineaworms were found (two under the skin of the right one under that of the left leg, and one at the breast). Probably the ulcer round the head of one of the worms in the right leg served as portal of entry for a serious tetanus

infection with which the patient came to hospital. The latter disease was cured (by intravenous injections of 40 per cent. urotropin?) and the worms subsequently extracted. Apparently the slow extraction in the course of a few days was the safest.

The author sent living larvae to BRUG (Med. Lab. Welterreden) who fed a local Cyclops species with them and found that they developed well in this host. It is not yet decided whether autochthonous infection with *F. malinensis* is possible in Java. The case described was an imported one—the patient left Arabia six months before he came under the author's observation.

W. J. RAIS.

BRUG (G.) Présence d'embryons de *Dracunculus medinensis* dans le pus d'un abcès. [Guinea Worm Embryos in an Abscess.]—*Ann. Parasit. Humaine et Comparée* 1928. Oct. 1. Vol. 8. No. 4. pp. 447-450. With 1 fig. [1 ref.] [St. Mandrier Hosp. Toulon.]

Guinea worm embryos occurred in pus freshly drawn by puncture of an abscess on the antero-external surface of the right leg of a case of dracunculiasis from which the adult worm had not been completely extracted.

R. T. L.

BROWN (H. W.) Further Studies on the Longevity of the Eggs of *Ascaris lumbricoides* and *A. suum*.—*Jl. Parasit.* 1928. Sept. Vol. 15. No. 1. pp. 14-22. With 1 graph. [11 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ. Baltimore, Md.]

Eggs of *Ascaris lumbricoides* from man and from pig were found to remain viable in sandy soil cultures kept out of doors during the winter 1926-27 at Baltimore U.S.A. The temperature alternated between freezing and thawing almost daily. All stages of embryonic development withstood these changes equally well. During the warm and dry weather of April the eggs in these cultures were killed. It was found that eggs when dried for a period contained a bubble of gas which aided the destruction of the egg upon moistening and the author offers a hypothetical explanation of its occurrence. Embryo-ated eggs of the pig *ascaris* dried at room temperature were exposed to a temperature of 35° C. for a short time—some were killed in 9 days, the majority were dead in 28 days and all were killed within 37 days.

R. T. L.

MAPLESTONE (P. A.) A Discussion on the Possibility of *Ascaris lumbricoides* Infection being acquired through the Skin.—*Indian Med. Gaz.* 1928. Oct. Vol. 63. No. 10. pp. 553-555. [20 refs.] [Calcutta School of Trop. Med. & Hyg. Calcutta.]

A consideration of data published by various other observers, notably the natural hatching of eggs outside the body after several months delay, and the observations of FULLERBORN on the migration of larvae by the blood stream, leads the author to suggest that possibly skin invasion with larvae of *Ascaris lumbricoides* from the soil may be a factor hitherto overlooked, in the aetiology of this infection.

R. T. L.

- CANNING (Graeme A.) **Precipitin Reactions with Various Tissues of *Ascaris lumbricoides* and Related Helminths.**—*Amer Jl Hyg* 1929 Jan. Vol. 9 No 1 pp. 207-226. [15 refs.] [Dept. of Hyg & Bact. Univ Chicago]

From the author's experiments it would appear that the use of whole worm tends to obscure the results. It is far better to find the most suitable tissue. Certain isolated tissues are pre-eminently owing to their composition and embryonic origin for use in performing immunological tests to trace biological relationships of animals whereas others are not only unsuitable but would cause confusion. Cuticle is non nucleated and hence does not show group reactions with the tissues within the species. It is a secretion product of an albuminoid nature.

R. T. L.

- COVENTRY (Frances A.) **Hypersensitiveness to Helminth Proteins. II. Cutaneous and Precipitin Tests with *Ascaris* Extracts in Infected and Immunized Animals.**—*Jl Preventive Med.* 1929 Jan. Vol. 3 No 1 pp 43-62. With 4 figs. [22 refs.] [Dept. of Hyg & Bact. Univ Chicago]

Intracutaneous injections of ascaris extracts in rabbits and guineapigs infected with ascaris induced cutaneous reactions (delayed type) and occurred in rabbits immunized with ascaris extract. They vary greatly in intensity but may persist for months after the total disappearance of worms from infected animals. They appear to be of the hypersensitivity to infection type. The reactions are specific for they do not occur in infected or immunized trichinous rabbits. Precipitins can be demonstrated in the serum of infected and immunized rabbits and guineapigs. They vary greatly in titre during the course of experimentation but may persist for at least 8 months in rabbits. This persistence and variability helps to explain the complete lack of correlation previously reported by the author between precipitin content of serum of Honduras natives and infection with ascaris as determined by stool examinations since practically all these natives were probably infected with ascaris at some period of their lives. Preliminary experiments failed to show passive transfer of skin hypersensitivity. The intensity of skin reactions failed to parallel the precipitin content of the serum.

R. T. L.

- HERRICK (Chester A.) & EMERY (Frederick E.) **Changes in the Tonicity of Smooth Muscle produced by Toxins of *Ascaris lumbricoides***—*Jl. Pharm. & Experim. Therap* 1929 Feb Vol. 35 No 2 pp. 129-141 With 3 text figs. [9 refs.] [Depts. of Zool. & Physiol. Univ Wisconsin.]

Extracts from *Ascaris* from the pig produce colicky symptoms diarrhoea, vomiting and frequent defaecation when fed to experimental animals. The extract showed haemolytic effects on the red blood cells of rabbits and guineapigs. There was an increase in the rate of contraction and in the tonus of muscle, and of isolated uterus of cat and rabbit.

R. T. L.

- I. KANAGARAYER (K.) Some Complications of Ascariasis.—*Malayan Med J* 1928 Dec. Vol. 3. No. 4 pp. 164-168. [8 refs.]
[Inst for Med Research F.M.S.]
- II. RYRIE (Gordon A.) Intestinal Obstruction due to Ascaris Infection.—*Ibid* pp 166-167

1. In Malaya the incidence of Ascaris infection is high, but Ascaris infestations as a rule give rise to no noticeable symptoms except vague gastro-intestinal disturbances especially in children. Occasionally the mechanical effects of obstruction of the gut and ducts leading thereto and the excretion of toxins lead to various pathological conditions. The author gives clinical notes of three fatal cases with unusual manifestations. One showed hyperpyrexia, marked irritability and hyperaesthesia. In the second there were convulsions with fever. In the third daily vomiting with worms passed *per os* and *per anum* with considerable abdominal pain and with emaciation. In a fourth case numerous small abscesses were found in the liver and the common bile duct was blocked by worms.

ii. To the above report Ryrie adds notes of a fifth case. At post mortem 1488 worms were collected. The small intestine was perforated in three places and had obviously given way owing to the mechanical action of its contents.

R. T. L.

- SHANABRANDAN (R.) Multiple Abscesses in the Liver Secondary to Ascaris Infection.—*Malayan Med J* 1928. June Vol. 3. No. 2 p 101

This paper notes the post-mortem findings in a case of a female child age 6 admitted to the General Hospital, Kangar. The liver was enlarged, congested and presented six abscesses on its surface varying in size from that of a marble to a pea. In each a large round worm was coiled up.

R. T. L.

- BARDENHEWER (H. E.) *Ascaris lumbricoides* Infestation with Extreme Anaemia.—*Jl Amer Med Assoc* 1928 Oct. 6 Vol. 91 No. 14 p 1037

There are no references in literature to the association of extreme anaemia with *Ascaris lumbricoides*. The author notes a fatal case in which this association occurred.

R. T. L.

- SAKAUDOMI (Takeo) [Experimental Studies on the Action of Ascarid Toxin].—*Saishugaku Zasshi (Jl of Bact)* 1928. Mar. No. 385. [Summarized in *Japan Med World* 1928. Aug. 15 Vol. 8. No. 8 p 219]

A quantity of Ascaris toxin was prepared by keeping an Ascaris for some time in Ringer's solution, and a second lot was prepared by making an emulsion of an Ascaris or its body fluid. A guinea-pig which was fed with this toxin succumbed after gradual emaciation. After infection death occurred within 3 to 14 hours. The pathological changes were similar in both cases. These were degenerative changes in the suprarenal capsules, liver heart, kidneys, lungs stomach and intestines.

R. T. L.

- SAKAGUCHI (Takeo) [On Hemoglobin in the Body Fluid of the Ascaris.]—*Saishingaku Zasshi (Jl of Bact)* 1928 Mar No 385 [Summarized in *Japan Med World* 1928. Aug 15 Vol 8. No 8 p 219]

The English summary reads as follows —

The author tried examination with the body fluid collected from very fresh specimen obtained directly from the slaughtered pigs. He cut one end of the ascarid body and allowed the body fluid drop into a glass dish with which he carried out chemical spectral and micro-chemical test methods, in all of which he obtained positive results. He also tested for hemolysin and demonstrated it in the esophagus stomach, and intestines but not in the uterus and ovarium of the ascaris

R. T. L.

- OTAKE (Masakichi) [On the Occurrence of Ascarid Embryos in the Mammary Glands.]—*Osaka Igakwai Zasshi (Jl Osaka Med Soc)* 1928. June Vol. 27 No 6 [Summarized in *Japan Med World* 1928 Dec. 15 Vol. 8 No 12. pp 329-330]

Ascariasis is sometimes found among sucklings. The author therefore examined mammary glands of experimentally infected guineapigs and was able to demonstrate infection of the gland with ascaris larvae in many cases. Some of the larvae were found wedged in the pathologically changed tissues and others in perfectly normal tissue. The larvae appeared to be derived from the blood infection. He infers that an intake of ascars from the mammary gland during suckling might cause ascariasis in human cases

R. T. L.

- BACHMAN (George W) An Intradermal Reaction in Experimental Trichiniasis.—*Jl Preventive Med.* 1928. Nov Vol. 2 No 6. pp. 513-523 With 1 coloured plate & 1 fig [3 refs.] [Dept. Hyg & Bact. Univ Chicago]

A local skin reaction specific in character follows the intracutaneous injection of *Trichinella* protein. Typical reactions appear within the first week after infection whereas precipitin tests show that specific precipitins are not demonstrable until 20 to 30 days after infection. As a method of diagnosis the skin reaction is easy and much more practicable than the precipitin test since it can be made 20 or 30 days before the precipitin test.

R. T. L.

- FORT (M. A.) Investigation of Hookworm Conditions among Pupils from Six to Ten Years of Age in Four School Districts in Decatur County Georgia.—*Southern Med. Jl* 1928. Nov Vol 21 No. 11 pp. 917-920 [10 refs.]

In South west Georgia the rate of hookworm infection among the children ranges from 69 to 80 per cent. An average reduction of 96 per cent. was obtained by the use of carbon tetrachloride. Although no accidents occurred with this drug in 5 000 cases SMILLIE and PESSOA's modification was adopted. The dose consists of carbon tetrachloride 2 parts and oil of chenopodium 1 part dispensed in a small homeo vial to be taken home and given on sugar in a spoon on waking in the morning. The sugar is quickly washed down with plenty of water and the child is made to lie in bed for an hour and a half. A full dose of salts is then administered and when this has acted the child is allowed

to eat breakfast and go out as usual. From a study of the eosinophilia present the author notices a high eosinophil count in children without hookworm and he believes even light infections with hookworm may produce an eosinophilia that lingers for years.

R. T. L.

JACOBS (W. P.). A Periodic Mass Treatment Programme as a Temporary Measure to control Hookworm Disease in Ceylon.—*Ceylon Jl Sci* (Sect. D Med. Sci.) 1929. Feb. 13. Vol. 2. Pt. 2. pp. 41-60 [4 refs.]

From clinical observations it had been realized that a considerable proportion of the inhabitants of Ceylon, although infected with hookworm suffered no ill-effects. Following upon the work of SMILLIE and AUGUSTINE it was considered a safe basis to set 40 worms (approx. 500 eggs per gram) as a temporary base-line below which treatment was not indicated. In 1924-5 every province was surveyed, by the aid of Stoll's technique, to determine the incidence and intensity of hookworm. The results gave an average count of 1103 eggs per gram of faeces per person for the country as a whole and over 50 per cent. harboured enough parasites to cause symptoms. A program was devised to give island-wide mass treatment at periodical intervals. A detailed account of the scheme is set out and as it has proved feasible and satisfactory in Ceylon it may be useful in other countries where the conditions are similar.

R. T. L.

JACOBS (W. P.). Value of Periodic Mass Treatment in controlling Hookworm Disease.—*Ceylon Jl Sci* (Sect. D Med. Sci.) 1929. Feb. 13. Vol. 2. Pt. 2. pp. 51-57. With 1 fig. [3 refs.]

The island wide mass treatment inaugurated in Ceylon in 1928 provided two rounds of treatment in schools and estates at 12 to 18 months interval. An egg-count was instituted before a third treatment was begun in the district. It was found that the two series of mass treatments in the Northern and North-Central Provinces had reduced the intensity rate, the egg-count falling from 1412 in 1925 to 391 in 1928.

R. T. L.

HOWARD (H. H.). Hookworm Disease and Hookworm Infestation in Porto Rico.—*Porto Rico Rev of Public Health & Trop. Med.* 1928. Dec. Vol. 4. No. 6. pp. 230-246.

In this eloquent popular address the author refers to the way in which the pit latrine (with a concrete base, a fly-proof box seat, a well-framed wood or sheet-iron super-structure and a sheet-iron roof) has become standardized throughout the world as the accepted type among great rural populations. A marked diminution of filth-borne diseases has followed their installation. A "bored hole" latrine is being tested in Egypt as an alternative but an element of doubt arises here for its frank purpose is to carry infective material into the ground water supply.

R. T. L.

MAPLESTONE (P. A.) A Simple Method of preserving Faeces containing Hookworm Eggs.—*Indian Jl Med Res.* 1929 Jan. Vol. 16. No 3. pp. 675-682. With 1 plate. [3 refs.] [Calcutta School of Trop. Med. & Hyg. Calcutta.]

After considering various practical difficulties in applying under Indian conditions LANE's method for the temporary preservation of stools containing hookworm eggs so that these can be examined at a central station instead of in the field, the author describes his experiences with antiformin in a 2 per cent. strength in water. Although the eggs degenerate in 14 to 18 days they are easily recognized because of the remarkable freedom from camouflage. Fermentation occurs and the eggs undergo no development but they are not killed for 24 hours after the addition of antiformin. Cultures were successfully made. The details of technique which has been followed in an investigation of 810 stools are given.

R. T. L.

SINCLAIR (Mavis J.) Comparison of the Caldwell and Stoll Methods of counting Hookworm Ova in Stools.—*Ceylon Jl Sci* (Sect. D Med. Sci.) 1929 Feb 13 Vol. 2 Pt. 2. pp. 59-65 [4 refs.]

A comparison of the Caldwell and Stoll methods shows that they differ so little that the ease and convenience of working need alone be considered. The Caldwell method obviates the tiring shaking required by the Stoll routine. The sugary solution of the Caldwell technique requires no coverslip and the viscid sugary solution is very easy to handle. Moreover the eggs float on the surface. The cost is in favour of the Stoll technique, but the Caldwell method is considered the easier cleaner and more satisfactory.

R. T. L.

AUGUSTINE (Donald L.) NAZMI (M.) HELWY (M.) & MCGAVRAN (Edward G.) The Ova-Parasite Ratio for *Ancylostoma duodenale* and *Ascaris lumbricoides*—*Jl Parasit* 1928. Sept. Vol. 15. No 1 pp. 45-51 [11 refs.] [Government School of Med. Cairo]

To gain some definite information on the ova parasite ratio for *Ancylostoma duodenale* when the parasite is the only hookworm present in a given population the senior authors visited Egypt and made an intensive study with two Egyptian colleagues of 74 cases. The factor 1.19 may with confidence, be used to estimate the number of females present when using the small drop 0.075 cc. according to Stoll's method. The female *Ancylostoma duodenale* produces therefore about 238 ova per cc. formed faeces. 27 cases of *Ascaris lumbricoides* were similarly studied. Here the factor was 13.5 and the female worm was computed to produce about 2,700 ova per cc. formed faeces.

R. T. L.

PAYNE (George C.) Penetration by Infective Hookworm Larvae of the Materials used in the Manufacture of Shoes.—*Amer Jl Trop Med.* 1929 Jan. Vol. 9 No 1 pp 79-82. [1 ref.]

Canvas shoes with rubber soles are distributed in large numbers by charitable organizations in the West Indies as a means of protection

from hookworms. This movement has adversely affected the campaign for improving the sanitary habits in these regions. The experiments recounted in this paper show that wet canvas shoes are readily penetrated by mature hookworm larvae. It is also proved that larvae migrate freely over although apparently they do not actually succeed in penetrating wet leather. Larvae readily enter minute defects in leather stitching and it is suggested that an ordinary pair of shoes will only give full protection to an agricultural labourer for a very short period.

R. T. L.

HEYDON (G. M.) The Effect of Light and of Drying on Infective Hookworm Larvae.—*Med J Australia* 1927 Oct. 29 14th Year Vol. 2 No 18 pp. 611-614 [5 refs.] [Australian Inst. Trop. Med. Townsville Queensland.]

Contrary to the opinion expressed by Looss after a critical study of the work of previous observers, the light of day rapidly injures and kills infective larvae of both species of hookworms which infest man, while larvae kept in complete darkness in water suffer practically no mortality for a long time. In experiments conducted at Townsville Queensland, exposure for two hours in clean water to direct sunlight was sufficient to kill all mature larvae while a few days exposure in diffuse daylight in a well-lighted room was similarly fatal. The author finds that the larvae of *Ancylostoma duodenale* can survive drying for short periods only though for more than a few minutes, in the climate of Townsville. In apparently dry earth some may survive for a few days. The larvae of *A. americanus* appear to be somewhat less resistant. Discontinuous illumination of *A. duodenale* larvae 10 days old to bright sunlight for six minutes daily proved that a total exposure of half an hour killed most of the larvae. A interesting application of the use of a hot needle to differentiate hookworm larvae from free living nematodes is mentioned.

R. T. L.

EIJMA (Molle). The Third Stage Larvae of *Ancylostoma caninum* and *Ancylostoma ceylanicum*.—*Tijdschr. d. Nederl. Dierkundige Vereeniging* 1923 3rd Ser Vol. 1 No 2 pp. 72-76. With 4 figs. [Inst. Trop. Med. & Lab. of Trop. Hyg. Univ. Leiden.]

From a biometric study of the larvae the author concludes that those of *Ancylostoma caninum* can be distinguished from those of *A. ceylanicum* by means of the length of the tail measured on the sheath. The following table must be used —

	<i>A. caninum</i>	<i>A. ceylanicum</i>
Total length (sheath)	532 μ -760 μ	608 μ -780-4 μ
Length of tail (sheath)	73 μ -109-6 μ	109-6 μ -145-5 μ

A method is described by which the head of the larva can be accurately examined. It is shown that the infective larvae of *A. ceylanicum* and of *A. caninum* have each three lips. On each lip are two papillae as described by Looss.

R. T. L.

KOBAYASHI (T) Ueber Regenerationserscheinungen der Erythrozyten bei Ankylostomiasisanämien. [The Regeneration Appearances of Erythrocytes in Ankylostomiasis Anaemia.]—*Japanese Jl Med Sciences Trans VIII Internal Med Paediatrics & Psychiatry* 1927 Dec. Vol. 1 No. 3. pp. 453-479 With 3 figs [57 refs.]

A study of the erythrocytes during the course of ankylostomiasis anaemia and during the treatment with iron is reported. The various abnormalities of the red cells their fragility their oxygen content, the presence of urobilin in the urine of patients and of bilirubin in their serum, are all discussed. During the treatment by iron the oxygen content of the red cells and its oscillation gave the first indication of improvement in the anaemia. Although the haemoglobin content and the red cell count gradually increased, it is pointed out that there is a primary increase in young erythrocytes. The urobilin of the urine the bilirubin of the serum and the serum protein all increased to their normal value.

Tables curves and illustrations of the different types of erythrocytes are given.

R Lovell.

SHELMIRE (Bedford) Experimental Creeping Eruption from a Cat and Dog Hookworm (*A. braziliense*)—*Jl Amer Med Assoc* 1928. Sept. 29 Vol. 91 No. 13 pp. 938-943. With 7 figs. [10 refs.] [College of Med. Baylor Univ. Dallas Texas.]

Clinical and experimental evidence is brought in support of the work of WHITE and DOVE implicating *Ancylostoma braziliense* [see this *Bulletin* Vol. 25 p. 701]. In more than one hundred cases in the author's practice a definite history of contact with moist earth or sand was obtained in most instances. By far the greatest number occurred in children. Picnicing or bathing at a sandy beach, wading in creeks digging in flower beds or making plumbing connections were some of the apparent sources of infection. Eighteen volunteers were submitted to experimental infection. A drop of water containing about 100 larvae was applied to the forearm in each case. Very fine photographs illustrating the local reactions are given in the text. There was no evidence that adult worms developed later.

R. T. L.

LAMBERT (S.) [Mass Treatment justifies Itself.] [Correspondence]—*Jl. Trop. Med. & Hyg.* 1928. Sept. 15 Vol. 31 No. 18. p. 244.

DR CORNEY to whom the credit of first noticing hookworm in Fiji was given by Lambert in his paper 'Mass Treatment justifies Itself,' has pointed out that in 1896 he wrote as follows in a Legislative Council Paper. The existence of this entozoon in Fiji was first noted by my predecessor Sir William MCGREGOR, in 1876 in the intestines of a native, and again in 1879 in two instances, but without pathological complications.

R. T. L.

RATNAL (J) & LEGER (J) Note au sujet de l'action des pyréthrine (chrysémaline) sur les ankylostomes. [Action of Chrysamine on Ankylostomes.]—*Bull Soc Path Exot* 1929 Jan. 9 Vol. 22 No 1 pp 23-28

In two cases with large numbers of hookworm eggs in their stools no effect was observed from the administration of chrysémaline in one case containing the eggs of whipworm also, these could not be found after the treatment

R. T. L.

MIKAMIZAKI (Tadao-haru) Studies on Natural Infections Road of Ancylostomiasis. I. Communiolation. Experiments on the Development of the Ancylostoma Eggs in the Soil and Water and the Longevity of the Larvae in them.—*Kwa-o Igaku (Jl Aero Med. Soc)* 1928 July Vol. 8 No 7 [Summarized in *Japan Med World* 1928 Dec. 15 Vol. 8 No 12 pp 328-329]

By spreading human faeces containing hookworm eggs, in the manner followed by the Japanese farmers in manuring the author studied the natural effects upon the viability of the eggs and larvae During the warm seasons the eggs developed into larvae which were recoverable from the soil for about six months During the cold season they did not develop into larvae but were quickly killed In the deeper layer of the soil and during the summer time the eggs hatched and the larvae lived for about 4 months, but during much colder seasons they were killed."

R. T. L.

OKRA (Tatsunosuke) [On the Changes of the Blood Features, especially Eosinophilia, in Parasitisms of Ancylostoma and its Allied Parasites. I.—*Tokyo Iy-Sa shi (Tokyo Med News)* 1928 Aug No. 2584 Summarized in *Japan Med World* 1928 Dec. 15 Vol. 8 No. 12 pp 324-325]

Ancylostoma infections can be differentiated from *Necator* infections, according to the author by the fact that in the former the eosinophilia is sometimes as much as 13 times the normal count while in the latter it is about 5 to 6 times.

R. T. L.

TRONIER (J) DESCHAMPS (R) LIMOUSIN (H) & DELORME (M) L'infestation du chimpanzé par un nématode du genre *Hepaticola*. [Infestation of Chimpanzee by *Hepaticola* sp.]—*Ann Inst Pasteur* 1928 July Vol. 42 No. 7 pp 827-840 With 2 text figs. & 1 coloured plate [21 refs]

This paper is of interest chiefly in the account it gives of the tissue reactions to *Hepaticola* invasions of the liver which are beautifully illustrated.

R. T. L.

BARR (Elsabeth) A Consideration of Some of the Intestinal Parasites, with a Report of Three Cases of "Oxyuris Incognita" Infestation.—*New Orleans Med & Surg Jl* 1928 Nov Vol. 81 No. 5 pp. 342-348. With 4 text figs. [8 refs.]

This popular lecture to the Louisiana State Medical Society deals with the five prevalent round worms in man. Mention is made of three instances of the occurrence in the stools of "Oxyuris incognita," i.e., *Heterodermis radicum*.

R. T. L.

NATHAN (Helmuth) Zwei seltene Befunde bei Oxyureninfektion des Menschen. [Two Rare Findings in Oxyuris Infection of Man.]—*Frankfurter Ztschr f Path.* 1928. Vol. 38. No 1 pp. 82-92. With 6 text figs. [20 refs.] [Path. Inst. General Hosp. Hamburg St. Georg]

Dr Nathan describes two unusual seats of infection of oxyuris in human patients. In one case the worms were said to be found in the spleen, and the author raises the question whether or not this is the first case of oxyuris infection in that organ. In the second case, the worms were found by incision, in a perianal abscess. Associated with this in the same region, was an inflamed area which passed on to the stage of abscess-formation only with difficulty. This area was characterized by a granulation tissue with an abundant eosinophilia. In the substance of the tissue were found large numbers of immature oxyuris eggs all of which were in process of being digested, either entire by giant cells or by the penetration into the eggs of leucocytes, microphages and macrophages. Dr Nathan remarks that the histological picture of this inflamed area bore similarities to that of the abscess.

R. T. L.

RIDDELL (W) Gordiidae as Parasites of Man.—*Cent f Bakt.* I. Abt. Orig. 1928. Nov 7 Vol. 109 No 5/6. pp. 331-338. [32 refs.]

In addition to recording a fresh case of infection of man with a gordiid worm the author has given a list of previous cases of human infection. The total recorded now numbers 23. The mode of infection is discussed, and although these worms develop normally in insect larvae the author does not think that the possibility of direct infection by the larva can be ruled out.

R. T. L.

STILES (C. W) & BAKER (C. E) A Fifth Case of *Gongylonema hominis* in Man in the United States.—*Jl Amer Med Assoc* 1928 Dec. 15 Vol. 91 No 24 pp 1891-1892

A round worm about 47 mm. long and considerably macerated had been removed from the lower lip of a girl aged 18 in Richmond, Va. The specimen showed the numerous bosses on the anterior end which are distinctive of the genus *Gongylonema*. As further specific differentiation could not be made the author prefers to name this a second specimen of *G. hominis* rather than attribute it to accidental infection with *G. pulchrum* or other species known in domesticated animals.

R. T. L.

ARCE (Jose) BALADO (Manuel) & FRAWES (Elisabeth) Anatomia patológica de la cisticercosis cerebral humana.—*Boi Inst. Clin. Quirúrg.* Buenos Aires. 1928. Vol. 4 No 34 pp 377-382 With 8 figs (5 coloured) [3 refs.]

— DIMITRI (Vicente) & BALADO (Manuel) A propósito de un caso de cisticercosis cerebral. Operación. Curación.—*Boi Inst. Clin. Quirúrg.* Buenos Aires 1928 Vol. 4 No. 34 pp 371-376. With 6 text figs.

- FREUDENTHAL (Poul) Echinococcose alvéolaire bovine observée pour la première fois en Islande.—*Acta Path. et Microb. Scandinavica*. 1927 Vol. 4 No. 3. pp. 206-220 With 8 figs. on 3 plates. [40 refs.] [Inst. of Path. Anat., Univ. Copenhagen.]
- GABDINA (M. P.) & SEATIROVA (V. A.) Sur l'Enterobius dans les pouponnières de Moscou et sur la stérilisation des porteurs.—*Russian Jl. Trop. Med.* 1928 Vol. 6. No. 6 pp. 394-401 [4 refs.] [In Russian.]
- GUTIÉRREZ LARA (J.) Ideas generales sobre el parasitismo intestinal en Fernando Poo.—*Medicina Paises Calidos* Madrid. 1929 Mar Vol. 2. No. 2. pp. 133-154
- KIMILLOVA-ODDINTSOVA (A. W.) Sur la fréquence du *Dibothrioccephalus latens* dans la Circonspection de Tomsk.—*Russian Jl. Trop. Med.* 1928 Vol. 6. No. 6 pp. 390-393 [In Russian.]
- SANCHELLA (F.) Ascariidose à forme typhoïde.—*Ann. Soc. Belge de Méd. Trop.* 1923. Dec Vol. 8 No. 3 pp. 291-292.

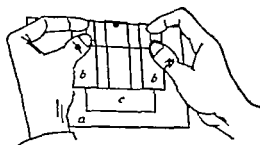
MISCELLANEOUS.

Cock (Frederick) **A Method of making a Blood Film.**—*Brit Med J* 1928. Feb 25 pp. 306-307 With 1 text fig

The method of making a blood film described in the following quotation from the original paper is said to assemble the leucocytes in the central zone of the film so completely that in the Leishman-stained film that zone shows to the naked eye as a bluish strip.

A piece of glass about the size of a half plate negative (*a* in the accompanying diagram) is cleaned, and on one side white paper is gummed so that the quality of the film can be more readily observed in preparation. *b* and *b* are each two glass slides stuck together with Canada balsam and mounted two inches apart on *a*. *c* is a single glass slide mounted in the position shown.

A drop of blood is taken on the end of a slide and placed between *b* and *b* and a second slide is made to rest on *b* and *b* at right angles to the first, so that there is the thickness of a slide separating the glass surfaces between which the drop of blood lies. Contact of blood between upper and lower slides is made by raising the latter which is then allowed to fall back on the stage. The upper slide is now passed over the lower the drop of blood following and leaving a very thin film behind, the time taken to traverse the slide being about thirty seconds. The margins of such a film



Method of making a blood film.
[Reproduced from the *British Medical Journal*]

consist mostly of red blood cells, while in the central zone numerous white blood cells and blood platelets are deposited. This arrangement is so striking that after using Leishman's stain the bluish tint of the central zone due to the basophil elements of the blood can be seen by the naked eye the margins are stained pink. Under the microscope the numerous white blood cells and blood platelets in the central zone immediately arrest attention, and in some specimens there will be fields where not a single red blood cell is to be seen. The number of white blood cells in a given field varies considerably but fifteen to thirty cells are quite commonly observed, and I have counted over sixty

A. Alcock.

BRAHMACHARI (Upendranath) & SEN (Parimal Bikas) **On a New Method of fixing Thick Blood Films for the Finding of Leishman-Donovan Bodies and Malarial Parasites in the Peripheral Blood.**—*Calcutta Med. J* 1928. Feb Vol. 22. No 8. pp. 439-441 With 1 text fig [Univ College of Science Calcutta.]

For details the original paper must be consulted. The film is spread by pulling not by pushing. After drying, the slide is kept well immersed

in acetone for 5 to 10 minutes, then quickly dried, dehaemoglobinized, washed with methyl alcohol, dried, and stained with Leishman or similar stain.

A. Alcock

OCHS (Georg Wilhelm). Ueber den Einfluss der Temperatur auf die Färbung von Blutausstrich-Präparaten. [Temperature and the Staining of Blood Films.]—*Folia Haematologica*. 1928. Dec. Vol. 37. No. 34. pp. 241-257. With 3 graphs in text. [29 refs.] [Children's Clinic, Univ. Frankfurt a. M.]

Methylene blue eosin and Giemsa stains in buffer solutions were used. With methylene blue the intensity of staining both of erythrocytes and nuclei of leucocytes increased at each temperature, as the alkalinity (pH 4.9 to 6.8) of the buffer solution increased. The cytoplasm of the lymphocytes proved an exception, for here the staining was more intense at pH 4.9 than at pH 6.8 and least at pH 6.0. The margin of the lymphocyte stained more deeply than the cytoplasm. With eosin the greatest intensity of staining occurred in the acid region, i.e. at pH 4.9 was less intense at pH 6.0 and still less at pH 6.8. When the pH of the buffer solution was kept constant and the temperature made to vary an increase of intensity of staining with rise of temperature was observed, although not of so definite a character. Much more striking was the alteration in shade of colouration. Giemsa staining reactions followed the same course as those of methylene blue. Erythrocytes may be stained with methylene blue, but the nuclei of leucocytes have not been stained with eosin. The staining of the granules of neutrophile leucocytes with the basic dye methylene blue was shown to be possible under certain conditions. Thus, with a pH of 6.8 at 2° C. some cells showed traces of staining of granules, while at 42° C. almost all the neutrophile leucocytes showed definite staining, while at 42° C. the affinity of the granules for the dye again diminished. This staining of neutrophile granules by basic dye with increase of temperature has its optimum effect at pH 6.0 to 7.0. Pathological granules may stain at a lower pH.

W. F. Harvey

FERRARI (Antonio). Coloração rápida dos hematocarios pela solução de azul-cozina. [A Solution for the Rapid Staining of Blood-Parasites.]—*Brasil-Médico*. 1928. Nov. 17. Vol. 42. No. 46. p. 1294.

Solution I. Methylene blue 1 gm., Ammon. carbonate 1 gm., Aq. dest. 100 cc. well mixed by grinding up in a clean mortar and placed in a 200 cc. flask for 8-10 days, being well shaken daily. To this is then added—

Solution II. Eosin 1 gm., Aq. dest. 500 cc., in a flask large enough to allow of thorough shaking. The vessel is then left for 24 hours for precipitation of methyl-eosinate of ammonia. The following day this is filtered off, dried at 37° C. and dissolved in 500 cc. of pure methyl alcohol, and to the product is added 0.25 cgm. of methylene blue and 5 per cent. neutral glycerin for preservation.

The method of use is as follows. On the fresh smear of blood is poured 4-5 drops of the staining solution and left for a minute. 8-10 drops of filtered water are next added and the slide gently agitated to mix the fluids and then left for 2 minutes, after which the slide is washed and dried. The whole process takes only three minutes and the differential staining is the same as that of Giemsa and other Romanowsky stains.

H. Harold Scott.

ACOM (Dean N) **Differential Blood Counts. A Comparison of the Accuracy obtained by Various Methods.**—*Jl Lab & Clin Med.* 1928. Jan. Vol. 13 No 4 pp 366-375 With 1 chart in text. [5 refs.] [School of Med. Univ of Colorado Denver]

The author discusses methods of making blood-counts in American practice so far as 82 answers to a questionnaire sent out by him afford data, and he concludes that a differential count made either with slides or with cover-slips is accurate within 3 per cent. if the film have been properly made and if 300 cells in three different areas have been counted. The method of making a film that he prefers as giving a more even distribution of leucocytes than any other is by cover-glass and slide. A small drop of blood is taken near the end of a clean slide. A cover-glass is dropped on this blood and as soon as the blood has spread to the full between the cover glass and the slide the cover-glass is slid fairly rapidly along the length of the slide with two fingers of the right hand, the slide being held firm on the table with the left hand.

A. Alcock.

NEWHAM (H. B.) & HARVEY (F. M.) **Some Notes on Blood Counts.**—*Jl Trop Med & Hyg* 1928. Apr 2. Vol. 31 No 7 pp 77-78. [1 ref.] [London School of Hygiene & Trop. Med.]

In the red-cell-counts here described the slide used by the authors was of the latest pattern of Leitz the uniformity of distribution of the cells over the whole scale being tested against an old slide of the Thoma Zeiss pattern. The following are their conclusions —

- (1) An error not exceeding $\pm 100,000$ is to be anticipated in any estimation.
- (2) In order to ensure approximate accuracy in any estimation of the red cell-content of the blood only accurately calibrated pipettes should be used.
- (3) An estimate based on the enumeration of the cells met with over 80 squares is unreliable 256 squares should be counted.
- (4) A greater degree of accuracy would appear to be obtained with the old pattern of counting chamber
- (5) It appears to be preferable to use a dilution of 1/100 rather than 1/200

A. Alcock.

SATO (Akira) & SHOJI (Kenji) **Counting Chamber Peroxidase Method for Blood. Simultaneous Rapid Differential Leucocyte Count and Total Leucocyte Count.**—*Jl Lab & Clin Med.* 1928. Aug Vol. 13 No 11 pp. 1058-1060 With 1 fig [3 refs.] [Dept. of Pediat. Faculty of Med. Tohoku Imperial Univ Sendai Japan.]

The technique is as follows —

- (1) Prepare the solutions A — 1 per cent. copper sulphate 90 30 per cent. acetic acid 1 glycerine 2 distilled water to 300 and filter B — Benzidine pur Merck 0.5 gm distilled water to 200 cc and filter Add 4 drops of 3 per cent. hydrogen peroxide to the filtrate and preserve in a brown bottle C — 1 per cent. saffranine filtered. (2) Set out 2 cc. of A in a watch glass and add 2 drops of C (3) Place 2 cc of B in a second watch glass (4) Draw blood in a leucocyte pipette up to the 0.3 mark and follow after wiping, with the solution in the first watch glass till the mixture fills the lower fourth of the pipette (5) Hold a finger over the

end of the pipette and rotate it on its long axis to mix blood and staining solution. (6) Wait for at least 4 minutes and then fill to the 11.0 mark with solution in second watch glass. (7) Mix thoroughly by rotation. (8) Count the leucocytes in a counting chamber.

By this method myeloid leucocytes are stained greenish blue monocytes appear faintly red with distinctly blue granules, and lymphocytes are stained distinctly red without any shade of blue or green.

W F Harvey

SATO (Akira) Two Methods for the Eosinophile Count in the Counting Chamber for Routine Work.—*JL Lab. & Clin. Med.* 1928. Aug. Vol. 13. No. 11 pp. 1056-1057 With 1 fig. [2 refs.] [Dept. of Pediat. Faculty of Med. Tohoku Imperial Univ., Sendai, Japan.]

The first procedure is intended for eosinophiles only and is a slight modification of the DUNGER method —

(1) Prepare No. 1 solution (a 1 per cent. water soluble eosin, Grubler) and No. 2 solution—acetone 1 part distilled water 5 parts. (2) Mix No. 1 solution, 1 part, and No. 2 solution, 4 parts. (3) Draw blood up to the ordinary mark in a leucocyte pipette and fill up with staining solution to mark 11. (4) Count the eosinophiles in a counting chamber.

The second procedure employs the peroxidase method of SATO and SHOJI (see above). By this method, with a low power objective, the eosinophiles show up dark blue among the lighter blue neutrophils, while monocytes appear red.

W F Harvey

DA GAMA (Luis Aleixo) Contribuição ao estudo do poder hemolítico do sangue em alguns estados normais e patológicos nos indígenas de Goa. [Study of the Haemolytic Power of the Blood in Normal and Pathological States in Natives of Goa.]—*Arquivos da Escola Méd.-Cirúrg. de Nova Goa* 1928. Ser. A. No. 2. pp. 219-237 French summary pp. 237-238. [Bact. Inst., Nova Goa.]

A few observations each on persons with tuberculosis, malaria, syphilis, nephritis, and pregnancy.

A. G. B.

BLUMENTHAL (W) Giemsa-Schnellfärbung für Blutpräparate.—[Rapid Giemsa Staining of Blood.]—*Munch. Med. Woch.* 1928. Nov. 9. Vol. 75. No. 45. p. 1922.

ARNETH. Bemerkung zu vorstehender Mitteilung.—*Ibid.* p. 1922.

Freshly prepared Giemsa solution is diluted with 3 parts methyl alcohol, which gives a permanent staining solution. Sufficient stain is placed on the dried film to cover it and allowed to act for 3 minutes. This also fixes the film. The stain is then diluted with an equal quantity of distilled water the two mixed, allowed to act for 3 to 5 minutes and then rapidly washed off with distilled water. The effectiveness of this procedure is vouched for by Arneth.

W F Harvey

PAWAN (J L.) A Note on the Use of the Romanowsky Stains in the Tropics.—*Ann Trop Med. & Parasit* 1928. Nov 9 Vol. 22. No. 3. pp. 303-305

Soda glass in a hot humid climate produces a film of surface alkali, and distilled water will readily take up this alkali. The results are an alteration of pH and unsatisfactory staining with Romanowsky stains. Such a film is much less liable to be formed with pyrex glass. Both distilled water therefore and the stain itself should be kept in pyrex glass bottles. Contrary to the ordinary view it is not necessary that the methyl alcohol used should be absolutely pure and acetone-free. Under the circumstances of a hot humid climate Leishman and Giemsa stains deteriorate when kept in ordinary glass bottles in 8 days. If pyrex glass be used a supply of stain will give good results for 6 to 9 months if small amounts of methyl alcohol are added to replace that lost by evaporation.

W F Harvey

CHUKERBUT (J C.) Technique for Leishman's Stain Suitable for "Field" Application.—*Indian Med. Gaz.* 1928 Oct. Vol. 63 No. 10 p. 578.

The method is as follows —

(1) Draw a boundary line with grease pencil on either side of the most homogeneous portion of the film (2) Pour freshly prepared stain on the enclosed portion and allow to dry thoroughly (3) Dip into methylated spirit and shake until the film becomes a greyish pink colour (4) Wash (5) Blot immediately dry and mount.

If sediment is still present treat again with methylated spirit.

W F Harvey

FEEMSTER (Roy F) & FEEMSTER (Olive S.) A Blood Stain giving more Constant Results. A New Departure in Staining with Romanowsky Stains which eliminates a Number of Sources of Error.—*Jl. Lab & Clin. Med* 1928. Sept. Vol. 13 No. 12 pp 1139-1143 [1 ref.] [Dept. Bact. & Path. Tulane Univ Louisiana.]

The method is one of overstaining with Wright's stain and decolourizing with the same stain dissolved in 85 to 90 per cent. ethyl alcohol.

Two solutions are used. No 1 is prepared by making a saturated solution of Wright's stain with the dry powder in absolute methyl alcohol, filtering and diluting with 1-5th its volume of methyl alcohol. No 2 is a saturated solution of the stain in 85 to 90 per cent. ethyl alcohol. The directions for using are given as (1) Drop on just sufficient No 1 solution to cover blood smear drain off excess stain at once let stand until all of the stain remaining on the slide turns red. (2) Flood with distilled water and allow to stand for one or two minutes. (3) Wash with the decolourizing No 2 solution until most of the red precipitate disappears. (4) Wash with distilled water dry and examine

Distilled water is usually slightly acid and makes a satisfactory diluting and washing medium. Variation in acidity however may be dealt with by the use of buffered solutions. For this purpose 1 per cent. pot dihydrogen phosphate and disodium hydrogen phosphate are kept. Ten cc. of the latter are added per litre of distilled water and 10 to 30 cc. of the former according to the shade of erythrocytes desired.

W F Harvey

ALROY (A. Cecil). Combined Vital and Non-Vital Method of staining Corpuscles.—*Lancet*. 1928. July 28. p. 170. [St. Mary's Hosp. Paddington, London.]

The technique is as follows —

(1) Use a clean grease-free slide. (2) Pass it through the flame 9 or 10 times. (3) Take a large drop of blood on the cooled slide and add to it about the same amount of 0.3 per cent. cresyl blue in normal salt solution containing 0.2 per cent. pot. oxalate. (4) Mix blood and stain by drawing up into pipette 3 or 4 times. (5) Place a drop of the mixture on the end of a clean slide and, holding another slide at an angle of 50° make a film. (6) Cover the dried film with 12 drops of fresh undiluted Leishman's stain and allow it to stand 2 minutes to fix. (7) Add 12 drops distilled water and allow to stand 7 to 30 minutes. (8) Wash the film carefully until nearly all the blue colour has disappeared. (9) Dry rapidly with blotting paper.

The washing must not be overdone and a faint blue tinge should remain. With this method reticulocytes are shown where polychromasia is given by Leishman's stain.

W. F. Harvey

SHU (H. J.) Liquid Paraffin replacing Cedar Oil in Microscopy — *China Med. J.* 1928. Feb. Vol. 42. No. 2. p. 114

Pure heavy paraffinum liquidum, B.P. (petrolatum liquidum, U.S.P.) is here stated to be an excellent substitute for cedar oil for microscope work. Indeed, since it remains clear in any climate is not volatile, is more limpid and does not become thick in cold weather, is easily wiped off the lens, is a good lubricant for the microscope, besides being cheaper and easier to obtain, it has some obvious advantages over cedar oil. It is also as good as cedar oil for clearing certain objects for microscopic examination—e.g. thick dried smears of faeces for eggs of intestinal worms.

A. A.

CHOPRA (R. N.) GUPTA (J. C.) & PILLAI (K. Venkataschalam). Observations on the Action of Emetine on the Gastro-Intestinal Tract.—*Indian J. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 883-888. With 4 graphs. [9 refs.] [School of Trop. Med. Calcutta.]

The summary and conclusions give an adequate account of this paper.

(1) A perusal of the literature shows that the action of emetine on the gastro-intestinal tract has not been properly investigated. Discordant views have been expressed regarding the action of this alkaloid on the motility of the gastro-intestinal tract by clinicians as well as by experimental workers. Some believe that emetine is an irritant and that it stimulates the movements of the gut thereby producing diarrhoea, while others say that it inhibits the movements thus giving rest to the inflamed gut and relieving tenesmus.

(2) The action of emetine hydrochloride on the digestive ferments has been studied. Even small traces of this salt such as 1 in 200,000 inhibit the action of ptyalin. Peptic digestion is, however, stimulated by concentrations higher than 1 in 1,000. Weaker solutions have no

effect. Proteolytic and lipolytic digestions are inhibited by concentrations below 1 in 10 000 weaker dilutions accelerate these. On the amylolytic digestion the action of the alkaloid is somewhat inhibitory.

(3) The action of emetine on the movements of the different portions of the alimentary tract both isolated and in situ was studied. A technique was specially devised by which simultaneous tracings of the different portions of the alimentary canal in situ could be recorded after intravenous administration of emetine. By both these methods it has been shown that the tone and the movements of the gut are stimulated the effect being more marked as we pass down from the stomach distally to the colon. [The colon is so sensitive that even dilutions higher than 1 in 1 000 000 produce an appreciable effect on its contractions.] The effects produced are due to the action of the alkaloid directly on the musculature of the tract and not through the nervous mechanism.

(4) The effect of the alkaloid on the vascularity of the gut is to increase it. After injections of emetine the blood appears to accumulate in the splanchnic area and the influx of the areas affected by *Entamoeba histolytica* by blood charged with the alkaloid would be a factor in curing the disease. The volume of the spleen is increased and its automatic movements are stimulated.

A. G. B.

BERMAN (Phoebus) & LEAKE (William H.) *Emetin—its Effect on the Rabbit's Heart. Research Prize Essay—1928.—California & Western Med.* 1928. June. Vol. 28. No. 6. pp. 772-776. With 9 text figs. [5 refs.] [General Hosp. Los Angeles.]

This is an electrocardiographic study which gained a prize of 150 dollars. Some of the conclusions reached are that emetine hydrochloride given intravenously to rabbits in doses between 1 and 2 mgm. per pound body weight produces ventricular tachycardia, which reverts to a normal rhythm in 10 minutes. that the intravenous M.L.D. is about 2 mgm. per lb. body weight. that a lethal dose produces ventricular fibrillation from which recovery did not take place. that daily intravenous injections of 1 mgm. per lb. body weight produced no marked electrocardiographic changes after 18 mgm. and 28 mgm. had been received.

A. G. B.

DUYSTER (M.) *Giftige Indische Planten. [Toxic Plants in the Dutch East Indies.]—Geneesk. Tijdschr. v. Nederl. Indië.* 1928. Vol. 68. No. 3. pp. 347-361.

After a short historical review of toxicological work in the D.E.I. the author a pharmacologist, insists that the use of herbaceous poisons by the natives is not nearly so common as the public is inclined to believe. The majority have no knowledge of this subject a few (native healers drug sellers etc.) know somewhat (but not much) more. Superstition plays a great part.

The author then quotes in some detail (for which the original paper must be consulted) the toxic action of *Abrus precatorius* *Gloriosa superba* *Phyllanthus distichus* *Datura fastuosa* *Dioscorea hirsuta* *Manihot utilisima* *Pangium edule* *Anamirta cocculus* *Derris elliptica* *Spigelia anthelmia* *Cerbera odollam* *Plumeria acutifolia*.

W. J. Bais.

CHOPRA (R. \) GHOSH (S.) & DUTT (A. T.). Ephedrine from the Indian Varieties of Ephedra.—*Indian Jl. Med. Res.* 1928. Apr Vol. 15. No. 4. pp. 889-894. [4 refs.] [School of Trop. Med. Calcutta.]

Under the name Ma Huang ephedra has been in use in China for the last 5 000 years as a diaphoretic, circulatory stimulant, antipyretic, and sedative in cough. The alkaloid ephedrine was isolated in 1897. Lately the alkaloid has been carefully studied at Peking its action resembles that of adrenaline but is more prolonged, and, unlike adrenaline it is effective when given by the mouth. It is an excellent cardiac stimulus. Hitherto most of the alkaloid has been obtained from China the authors sought in India for species of Ephedra containing it. Here is the result of their researches.

(1) A number of varieties of ephedra grow in India, the common ones being (1) *E. vulgaris* Rich. (2) *E. pachyclada* Boiss. also known as *E. intermedia* Schrenk and Mey. (3) *E. peduncularis*.

Two other varieties of lesser importance, *E. foetida* and *E. fragilis* occur in Beluchistan but they are not common.

(2) Specimens of *E. vulgaris* and *E. pachyclada* or *E. intermedia* were obtained, chemically analysed and physiologically tested. The yield of total alkaloids from the former was 0.92 per cent. and from the latter 1.16 per cent.

(3) The percentage of ephedrine in the total alkaloids obtained from an average sample of *E. vulgaris* was 71.25 the residue being mostly pseudo-ephedrine.

(4) The green twigs showed a very much higher alkaloid content than the stem.

(5) The physiological and clinical reactions of the Indian alkaloid were identical with the alkaloid obtained from the Chinese ephedra."

A. G. B.

CHOPRA (R. \) GUPTA (J. C.) & GHOSH (S. \). Indian Varieties of Aconite: their Chemical Composition and Biological Assay.—*Indian Jl. Med. Res.* 1928. Apr Vol. 15. No. 4. pp. 873-882. [11 refs.] [School of Trop. Med. Calcutta.]

Aconite is one of the oldest remedies used by the Hindi and Mohammedan physicians in India and one of the commonest drugs sold. It is largely used as an external application for painful affections internally it is given for treatment of fever and rheumatism and as a remedy for cough, asthma and snake-bite. Up to the present the Indian aconites have been used only externally the reason being that they have not been properly standardized. The authors deal here with the assay of specimens of the drug readily available in the Indian market. They discuss the classification of the Indian species as revised by STARR. They investigated a number of specimens both chemically and biologically. Their conclusions may be summed up thus—

The common poisonous varieties of aconites on the Indian market are (1) the so-called 'ferox variety' which is a mixture of two species and sometimes of four. (2) the Indian *napellus* variety now known as *A. charmantium* Stapf. The alkaloid content of (1) is, chemically double that of the European *A. napellus* official in the pharmacopoeia and of (2) is ten times as great. Biologically the ether soluble alkaloid

(pseudoaconitine) of (1) is 1.5 times stronger than aconitine from the European *A. napellus* and the alkaloids of *A. chasmanthum* are 0.7 times weaker. It follows that (1) is three times as strong and (2) seven times as strong as the European root.

A. G. B.

EYRE (John) NOTTON (H. E. F.) & POPE (William J.) **Mercurochrome 220 Soluble.**—*Brit. Med. J.* 1928. Aug 11 pp 238-241
With 7 charts. [7 refs.]

The conclusions of this paper which deals with the chemistry of mercurochrome 220 and describes tests of different samples and observations on man are that

(1) The various specimens of mercurochrome on the market differ markedly in their chemical composition. (2) Toxicity appears to bear a direct relationship to purity of composition. (3) The nearer mercurochrome approximates in its analytical results to its known chemical constitution the better the preparation as regards therapeutic efficiency and low toxicity.

They suggest that mercurochrome follows the law of chemotherapy in that it acts only through the body tissues. Controlled experiments on animals have they write made it clear that mercurochrome can effect a cure in a considerable proportion of cases.

A. G. B.

CHOPRA (R. N.) DAVID (J. C.) & DIKSHIT (B. B.) **A Comparative Study of the Action of Cinchona Alkaloids on the Uterus.**—*Indian J. Med. Res.* 1928. Jan. Vol. 15 No. 3. pp 571-580
With 9 graphs. [13 refs.] (Dept. of Pharmacol. Calcutta School of Trop. Med. & Hyg.)

The summary and conclusions are as follows —

1 The cinchona derivatives show varying degrees of stimulating effects on the uterus of the cat and the guinea-pig. The uterus of guinea-pig is much more sensitive than the uterus of cat. The pH at which maximal results are obtained varies with the uteri of different animals. The cat's uterus works best at pH 7.6 while the guinea-pig's uterus acts best at 7.2.

2. The dextro-rotatory alkaloids have a more powerful effect on the uterus than the laevo-rotatory ones.

3 The most powerful in this series is quinamine of which such high dilutions as 1 in 500 000 cause marked tonic contractions of the isolated virgin, multiparous non pregnant and the pregnant uterus. 2 to 5 mg doses given intravenously produce a marked tonic contraction of the intact uterus both pregnant and non pregnant. The amplitude of the rhythmic movements is also increased. Next in order may be placed ethyl hydrocupreidine iso-octyl hydrocupreine or vaxin and cinchonine whose activity is about the same. Next comes ethyl hydrocupreine and then quinine and quinidine the last two being about equally effective. The least powerful of this series, in the order of their activity are cinchonidine iso-heptyl hydrocupreidine and iso-heptyl hydrocupreine. The action of the last two being slight and inconstant.

"4 Our experiments show that the oxytocic action of quinine is quite pronounced when the uterus is nearly full term, but in early cases of pregnancy beyond slightly increasing the amplitude of the automatic movements no untoward effect is likely to be produced. This is also borne out by clinical experience."

A. G. B.

MAYERA (Selbun). Beiträge zur Erforschung des Wirkungsmechanismus der Chinainalkaloide bei freilebenden Organismen. [Investigation of the Mode of Action of the Chinona Alkaloids on Free-living Organisms.]—*Beihfte z. Arch. f. Schiffsz- u. Trop. Hyg.* 1928. Vol. 22. No. 3. pp. 5-30 [129-154]. With 6 text figs. [32 refs.]

Many observers have recorded that the salts of physiologically active bases are potentiated by alkali, and, especially in the case of local anaesthetics, explanations of this action have been given. Some references to papers on this subject in German journals are given in the memoir now under review but other relevant papers are the following.

J. RÉGNIER, *Bull. des Sci. Pharmacol.* 1924. Vol. 31. p. 513. 1925. Vol. 32. pp. 271-513. J. W. TREXAN and E. BOOCK, *Brit. Journ. Exp. Path.*, 1927. Vol. 8. p. 307. H. W. ACTON this Bulletin, Vol. 19. p. 103, and T. A. HENRY and H. C. BROWN *ibid.* Vol. 20. p. 782.

The author has studied the toxicity of quinine and a series of its derivatives, in solutions of varying pH, on *Colpidium colpoda*, the toxicity being measured by the time (y in minutes) required to kill the infusoria by a solution of the alkaloidal monohydrochloride of known strength, maintained at a definite hydrogen-ion concentration (x) by addition of Sørensen's phosphate mixture as a buffer. The results can be expressed in the form of activity curves by plotting times against pH for each concentration of alkaloid ($M/2,000$ to $M/200$) and these curves conform with the general formula $y = ax^n$ where x and y have the signification mentioned above and a and n are constants for the alkaloid at a particular concentration. In general n falls with the toxicity effect, implying that the toxicity is less dependent on pH at lower than at higher concentrations and that it is the base itself and not the ions or the salt which is active. Among the seven alkaloids examined, quinine and hydroquinine are most affected by variation in pH, quinethyline and deoxyquinine less and optoquine, eucupine and quibacine (quinatoxine) least. In general the toxicity increases by 20 to 30 per cent. for each rise of 0.2 in pH being at a maximum at pH=8.0 and the author suggests this should be taken into account into using quinine or its derivatives locally though he points out the difficulty in doing this since the acid salts are the more soluble and only dilute solutions are obtainable at a pH of 7.4 to 8.0. He considers that a preparation is needed with a low dissociation constant to ensure as complete dissociation into base as possible in solution. The activity curves resemble very closely dissociation curves for weak bases combined with strong acids, and run parallel with those obtained by plotting surface tension against pH. From a consideration of all the results, the author considers that the toxicity of this group of alkaloids to infusoria depends upon (1) the presence of the free base produced by dissociation of the salt, (2) adsorption of this free base by the organism and (3) the action of a toxophore group in the adsorbed base upon some component of the organism.

T. A. Henry

GIBBS (O S) *On the Adsorption of Quinine by Blood Cells.*—*Jl Pharm. & Experim. Therap* 1928. June. Vol. 33 No 2. pp. 185-190 [8 refs.] [Pharmacol. Dept. Dalhousie Univ. Halifax Nova Scotia.]

The author has investigated the distribution between blood cells and serum, which ensues when neutral quinine hydrochloride is added to rabbits blood using for this purpose the method originated by RAMSDEN and LIPEIN (this *Bulletin* Vol. 12 p 342) but modified in details on the lines already adopted by KING and ACTON (*Biochem J* 1921 Vol. 15, p 53) whose observations on the process are confirmed. The author's conclusions are that under the conditions observed in his experiments distribution is approximately equal between the cells and the serum, the divergences from equality being small and occurring on either side. The alkaloid is probably adsorbed and this adsorptive property of quinine already observed by many authors is of great importance not only in affecting its distribution in colloidal media but also in introducing errors in methods for ascertaining this distribution.

T. A. Henry

BANERJI (Binode Krishna) *Quinine Intolerance.*—*Indian Med Gaz* 1928 Sept Vol. 63 No 9 p 533

Two cases in which a small dose of quinine or cinchona caused skin irritation urticaria, oedema and other symptoms. The intolerance was overcome by cinchona febrifuge starting with 1/8 grain doses and working up to 2½ grains 4 times daily

A. G. B.

- i. SCHMIDT (Hans) *The Pentavalent Antimony Compounds in Tropical Medicine.*—*Indian Med Gaz.* 1928. Nov Vol. 63. No 11 pp 643-650 [76 refs.]
- ii. GHOSH (Sudhamoy) CHOPRA (R. N.) & CHATTERJEE (Nilhar Ranjan) *Urea-Stibamine its Preparation and Composition.*—*Indian Jl Med. Res* 1928. Oct. Vol. 16. No 2. pp 461-468. [4 refs.] [Calcutta School of Trop. Med. Calcutta.]
- iii. — *A Simple Method for the Estimation of Antimony in Organic Antimony Compounds.*—*Ibid* pp. 457-460 [4 refs.]

i. There has been much activity in the chemical, pharmacological and clinical investigation of the organic compounds of antimony in England, Germany and India since 1910. In this work the special contribution of Dr Schmidt has been the discovery of the conditions under which the Bart reaction could be applied in the preparation of arylstibinic acids an important advance which has made it possible to produce commercially the numerous compounds of this type—stibacetin, stibosan, neostibosan, urea-stibamine, neostam, etc.—which have been used so successfully in recent years by NAPIER and others in the treatment of kala azar. Apart from a little further information regarding the production of neostibosan (diethylamine salt of *p*-aminophenyl stibinic acid) there is nothing new in the article, which is however an excellent summary of the recent history of the therapeutical application of pentavalent antimony compounds.

ii. These compounds are all amorphous and for that reason are not amenable to ordinary chemical processes of purification. The

manufacturer must, therefore rely on rigid adherence to a process which experience has shown will yield a product of low toxicity and high therapeutic efficiency as determined by biological tests. It is for this reason that some discussion has taken place regarding (1) the methods of preparation which have been published for urea-stibamine, and (2) the constitution of this interesting example of Indian synthetic drug production (this *Bulletin* Vol. 22, p. 199). The present authors state that if "the vague and scanty" descriptions given by BRAHMACHARI are followed, a very poor yield is obtained, and they have worked out a process for improving it. Up to the production of *p*-amino-phenylstibinic acid the process is essentially that of the von Heyden patents and need not be described. The actual combination of this acid with the urea is the important point and that is achieved as follows. To the acid suspended in a little water and warmed on a water-bath, about an equal weight of urea is added in small portions with constant stirring until solution is effected, after which the heating is continued for some time, and the solution is finally concentrated to about one-third its volume and allowed to cool. Absolute alcohol is then added to precipitate the urea-stibamine, which is rapidly filtered off with the aid of a pump washed with cold alcohol and dried in a desiccator over calcium chloride. The yield is given as about 3 gms., presumably from 7.5 gms. of *p*-aminoacetanilide used as the starting material. The cost is stated to be 7 annas per gm. for materials alone, or 1 rupee per gm. including all overhead charges (labour etc.) but it is not clear that anything has been allowed in this figure for the inevitable difficulties that arise in transferring a difficult laboratory operation to large scale factory production or for the high cost of biological control of the finished product, which in Europe at any rate would be provided by any reputable manufacturer. The authors give no analyses which can clearly be assigned to their own product, but they have examined samples of different brands of the drug available in the Indian market with interesting results, which may be summarized as follows —

(1) Extraction of five samples to exhaustion with a mixture of equal volumes of ether and absolute alcohol removed 14.4 53.3 55.0 12.0 and 48.0 per cent. of soluble material, mainly urea. The insoluble residues from four of these samples, which should consist of urea-stibamine contained nitrogen, 4.9 5.2, 4.53 and 3.69 per cent. and antimony 44.1 38.93 36.59 43.65 per cent. respectively.

(2) Estimations of the amount of urea present in seven samples of urea-stibamine by the hypobromite method gave 6.15 58.56, 50.03, 8.6, 47.29 9.3 47.17 per cent. respectively. The total nitrogen, determined by combustion, in four samples varied from 5.77 to 26.23 per cent.

(3) The antimony content in 13 different samples determined by Ghosh's method (*see below*) varied from 19.88 to 43.59 per cent. For comparison with these figures it may be added that Brahmachari's formula for urea-stibamine, $C_7H_{11}O_4N_2Sb$ requires the absence of free urea and the presence of nitrogen 13.0 per cent. and antimony 37.6 per cent.

The authors suggest that in view of the great variation in composition disclosed by the results of their examination of commercial samples, a standard should be laid down for maximum and minimum content of antimony in the various brands of urea-stibamine on the Indian market.

In compounds of this type the results of chemical analysis are only

of value as a means of indicating carelessness in manufacture or gross adulteration and these interesting results would have been greatly enhanced in value by the addition of toxicity and therapeutic efficiency tests of the various samples.

iii. The method used is essentially that of NORTON & KOCH as modified by EWINS which it has been found possible to simplify still further by the use of not more than 0.05 to 0.07 gm. of the substance to be analysed. This quantity is digested with sulphuric acid and potassium sulphate with all the precautions observed in the similar stage of a Kjeldahl estimation of nitrogen. The colourless residual liquid is diluted, boiled to eliminate any sulphur dioxide mixed while still warm with 3 to 4 cc. of hydrochloric acid, cooled to room temperature and diluted to 100 cc. in a measuring flask. Twenty five cc. of the liquid are made faintly alkaline by dropping in 40 per cent. caustic soda solution, then rendered acid with tartaric acid and finally slightly alkaline with sodium bicarbonate. The liquid so prepared is titrated with N/100 iodine solution using starch as indicator. The iodine solution should be standardized periodically against pure tartar emetic (0.00166 gm.=1 cc. of N/100 iodine)

T. A. Henry

CHOPRA (R. N.) GUPTA (J. C.) & CHOUDHURY (S. G.) **Action of Antimony Compounds on the Adrenals.**—*Indian Jl Med Res* 1928. Oct. Vol. 16. No. 2. pp 441-446. [4 refs.] [Calcutta School of Trop. Med. & Hyg. Calcutta.]

This action was considered important because in kala azar there is a marked degree of hypo-adrenia and antimony compounds are of benefit. The authors' summary and conclusions are as follows —

The experiments on Belgian hare rabbits show that after intravenous injections of organic compounds of antimony there is a definite increase in the residual epinephrine content of the gland as compared with the normal gland. After the first 2 or 3 injections the increase is slight, but after a larger number of injections the increase is definite and marked. After 10 injections the adrenaline content is nearly doubled.

A. G. B.

GOIFFON (R.) **La thérapeutique intestinale par médicaments adsorbés.** [*Intestinal Therapeutics by Adsorbed Drugs.*]—*Paris Méd* 1928. May 26. No. 21. pp. 481-483. [2 refs.]

Two years ago the author reported on the happy effects in spasmodic colic of atropin fixed on charcoal and more recently BLUM has described other applications of the same principle. This is that charcoal in contact with certain gaseous or soluble bodies fixes them by adsorption like a dye but in contact with bodies which lower surface tension the fixed substance is gradually given up. The author has used emetine in this way 3 teaspoons of charcoal containing 5 cgm. daily and gives a short account of one chronic case of amoebiasis so treated. Arsenobenzol also is employed thus 0.05 gm. per teaspoonful of charcoal. Two teaspoons per day may be given for a long time. One thus secures its local without its general effect. Cases of flagellate diarrhoea and diarrhoea associated with the presence of spirilla have been so treated with success. [Few details are given and the source of the charcoal is not indicated.]

A. G. B.

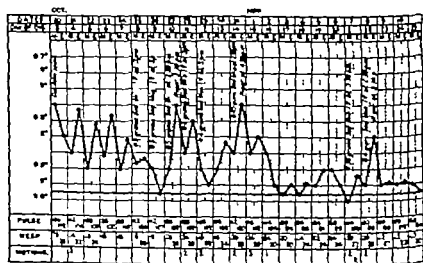
MITRA (A. C.). Toxic Symptoms following Administration of Carbon Tetrachloride.—*Indian Med. Gaz.* 1928. Nov Vol. 63. No. 11 p. 637

Prisoners of Bihar and Orissa jails are treated on their admission by carbon tetrachloride. Of a batch of 6 prisoners given CCl_4 minims 45 at 7.0 a.m. one, a healthy man of 30 felt nausea an hour later vomited, and complained of colic. After 20 minutes urticaria appeared till the whole body was bloated up. By the afternoon he had recovered. Ankylostomes and round worms were present in his stool. Three thousand prisoners have been thus treated with no mishaps but this. It is suggested by MARLESTONE that the symptoms were due to the presence of ascari but he admits the explanation to be incomplete.

A. G. B.

ANXLEY (F. D.). A Case of Stovarsol Poisoning.—*Jl. Roy Army Med. Corps.* 1928. May Vol. 50 No. 5. pp. 367-369. With 1 chart in text.

The patient, an Indian doctor aged 30 found he was harbouring cysts of *Entamoeba histolytica* and took stovarsol, 4 grams twice daily for 12 days, and after an interval of 10 days repeated the course, about 200 grains in all. Three weeks later symptoms appeared. When seen a day or two later October 19 he had a papular urticaria-like rash on the face neck and trunk and to a less degree on the extremities with oedema of face and neck. Papules were present in the mouth and on the palate with much pain on swallowing. The next day the temperature was 104 and the pulse 106. On October 21 the rash was spreading and in places had become vesicular with discharge of serous fluid. On the 23rd it was purpuric on the legs. The patient, who had hitherto negatived the suggestion that it was a drug rash, now admitted the stovarsol. The chart reveals the further course of



Temperature chart relating to first three weeks in hospital of patient with stovarsol poisoning
[Reproduced from the *Journal of the Royal Army Medical Corps*]

the case and its treatment. On October 30 large areas of skin on the extremities were about to scale off. By November 30 he had practically recovered. The author notes the late development of symptoms. He cannot explain the origin of the rigors (see chart). He is unaware whether Indians are susceptible to arsenical preparations see also this *Bulletin* Vol. 24 p. 672 Vol. 25 p. 414.

A. G. B.

BASLOVATZ (A.) Cas de mort consécutif à une injection de trypan-arsyl. Death after an Injection of Trypanarsyl. — *Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21 No. 3 p. 211 (Med. Service, "Société de Colonisation Agricole," Mayumbé.)

A native woman, aged 35, was recognized by gland puncture to have trypanosomiasis. Her condition was "mâlocre" not bad. Two gm. trypanarsyl (Belgian trypanarside) was injected into a vein. Two days later there was pronounced jaundice with temperature 38.1 C. and grave general symptoms. After another two days the jaundice was still marked with urine only slightly coloured and not albuminous. The patient was not seen again and died ten days after the injection. Several other persons were treated with the same solution on the same day without mishap. This is the second death in a series of 800 injections. The first was that of a baby who probably had an overdose.

A. G. B.

MARQUARD (G.) Double cas d'asphyxie mortelle causée par du manioc insuffisamment sec. (Two Cases of Fatal Asphyxia caused by Insufficiently Dry Manioc). — *Bull. Soc. Path. Exot.* 1928. Dec. 12. Vol. 21 No. 10 pp. 879-881.

A young Malagasy couple made a pile of fresh manioc in their hut went to bed and were found dead next morning. Autopsy revealed the signs of asphyxia. While under in a closed space with such manioc succumbed. It seems uncertain whether HCN played a part as well as CO₂. Ingestion of the manioc did not lead to symptoms of poisoning.

A. G. B.

PERUZZI (MARIO) Le cellule a globi pallidi in alcune affezioni tropicali. (Intra-cellular Hyaline Bodies in some Tropical Affections). — *Ann. di Med. Ver. e Colon.* 1928. Sept.-Oct. Year 34. Vol. 2 No. 3-4. pp. 173-186. With 19 figs. on 1 plate. [9 refs.]

The bodies to which the author refers have been given various names such as hyaline degeneration, colloid degeneration, morula cells, Mott's cells, fuchsinophilic bodies, Russel bodies etc. confusion arising from the fact that their nature is undetermined. Peruzzi shows that they are found typically in interstitial connective tissue but occur also in glandular cells such as renal epithelium, in molluscum contagiosum, in neoplastic cells amongst other conditions. The bodies are not, as some have stated, the products of secretion, but are of a degenerative nature, never found, however, in acute pathological processes only in chronic, and occurring in inflammation of a sclerosing proliferative type, such, for example, as granulomatous conditions and other affections with prolonged course.

H. Harold Scott.

LA ROSA (Gaetano) L'agglutinazione aspecifica a mezzo dell'acido lattico quale criterio per la diagnosi differenziale di alcuni germi simili. [Non-specific Agglutination by Lactic Acid.]—*Bol. Istituto Sieroterap. Milanese* 1928. Apr. Vol. 7 No. 4. pp. 177-185. [14 refs.] French summary p. 185. [Inst. of Hyg. & Bact. Univ. Catania.]

References to the use of lactic acid for the differentiation of allied organisms by non-specific agglutination will be found in this *Bulletin*—TRENTINI 1926, p. 729. VERCELLANA & ZANUCCHI, 1928 p. 729. VERCELLANA, 1927 p. 47. FAVILLI 1927 p. 113. BEGUET 1927 pp. 114-617. CERRUTI 1927 p. 118. GRACIOSI, 1927 p. 618.

The author finds (1) That no reliance can be placed on lactic acid agglutination for the differentiation of cholera from cholera-like vibrios (2) that, as has already been shown for *Br. mediterraneus* and *Br. abortus* this reaction does not suffice to separate the intestinal organisms (colon, dysentery typhoid and paratyphoid) (3) that agglutination with peptone and thermoagglutination are equally unsatisfactory (4) that, as BIGUER has shown the lactic acid reaction is common to all acids which have the power of agglutinating *Br. mediterraneus* and other organisms producing flocculable substance."

W. F. Harvey

ALESSANDRINI (A.) & PAMPANA (E. J.) Sur la culture des hélicobactéries vincenti. [Cultivation of "Helicobacterium vincenti."—*C.R. Soc. Biol.* 1928. May 21 Vol. 98. No. 16. pp. 1383-1387 With 1 text fig. [1 ref.] [Hyg. Inst. Univ. Rome.]

Fusiform bacilli are not easy to grow or to maintain alive. The authors medium is prepared as follows—

(1) Leave 500 gm. minced beef in the ice chest for 24 hrs. (2) Grind up the beef finely with sand and add 1 000 cc. water. (3) Leave at room temperature for 6 to 8 hrs. Filter through cotton wool and then through paper. (4) Add to the filtrate 1 per cent pure medicinal peptone and 0.5 per cent. salt, allowing them to dissolve without heat. (5) Dilute this nutrient medium with water to specific gravity 1.007 at 15° C. and adjust reaction to pH 6.8. (6) Filter immediately through Berkefeld N candle. (7) Distribute the ruby red fluid in test tubes.

At room temperature this medium remains unaltered. at 37° C. it becomes turbid in 12-18 hrs. and yellowish. If, however the original red colour persists it should be looked on as contaminated. When the spirochaetal form of "Helicobacterium vincenti" is sown in this medium and incubated for 24 to 48 hrs. at 37° C. a growth will be obtained, consisting of short spirochaetal forms of definitely vibrio or spiral type with tapering ends and also longer forms with as many as 34 turns or more to the spiral. By the 6th or 7th day short forms predominate they have lost their spiral character are straight and, with their tapering ends are exactly like the fusiform bacillus. During growth the medium undergoes changes of colour. It is not specific for *Helicobacterium vincenti*. In it *Vibrio finlay-brown* loses its vibrio form and becomes fusiform.

W. F. Harvey

ALESSANDRINI (A.) & PAMPANA (E. J.) *Ricerche sulla morfologia e biologia dell' Heliconema vincenti* Sanarelli. [Morphology and Biology of *Heliconema vincenti* Sanarelli.]—*Ann d'Igiene* 1928. Nov Vol. 38. No. 11 pp 881-927 With 14 figs. on 2 plates. [29 refs.] [Hyg Inst. Univ Rome.]

The supposed symbiosis of spirochaetes and fusiform bacilli, the organisms associated with Vincent's angina, was first given a satisfactory explanation by SANARELLI. He showed that the fusiform and spirillar forms were one and the same species of organism and that the former were derived from the latter. The name that has been given to the organism is *Heliconema vincenti*. Four strains were available for study three new strains derived from the liver of a rabbit the heart blood of a guinea pig and the liver of a new born dog respectively and the fourth an old strain. Cultivation of these on various media has been tried but with indifferent success. Broth filtrates, too of cultures of various bacteria were used for cultivation and it was in such a filtrate of a *B. mesentericus* culture that SANARELLI obtained the transformation of spirochaetal forms into fusiform. The most favourable filtrates for growth are obtained from cultures of *Sarcina aurantiaca* and *Aspergillus niger*. A new medium No. 1 (see above) is described for culture which has proved satisfactory. An important modification of this medium is one in which peptone and salt are omitted—medium No 2. Medium No 1 favours the transformation of spirochaete forms into fusiform and sometimes the latter into the former while medium No 2 preserves the spirochaetal type without change. The behaviour of *Vibrio finkler-prior* in medium No 1 was surprising for an examination of the pellicle showed the presence of fusiform bacilli instead of the ordinary comma forms.

Various characters of the new organism were worked out in detail such as the effect of oxygen optimum incubation temperature, thermal death point fermentation of sugars indol and gas production etc. The question arises in what group or family of organisms *H. vincenti* is to be placed. It is an extraordinarily pleomorphic organism. The *Spirillaceae* are typical vibrios as young forms have rigid spirals and are provided with cilia. One member of this family the Finkler Prior vibrio can change to fusiform type. But in spite of this fact *H. vincenti* cannot be included in the *Spirillaceae*. Having non rigid spirals and terminal filament instead of cilia it has affinities with the *Spirochaetaceae* but is excluded from that family on account of its pleomorphism. None of the spirochaetes show fusiform development. Therefore the authors create the new family *Heliconemaceae* into which to place the genus *Heliconema*.

W F Harvey

JAMES (W M.) *Notes on a Microscopical Equipment for Use in the Tropics*.—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 267-272.

These notes are as applicable to microscopical equipment in any part of the world as in the Tropics. Some of the recommendations are—the binocular tube for interchange with the monocular the purchase of fluorite objectives at little additional cost, instead of achromatic the preference of a 1 10th. fluorite oil immersion for the 12th the use of a thin piece of daylight glass to modify the

light from the frosted electric light bulb a centring achromatic substage condenser in place of the ordinary Abbe a source of light which should be sufficiently intense and which is to be modified by appropriate light filters a dark field condenser which is easily attached, centred and removed.

An extremely useful objective is an apochromatic 8 mm. or 1.3 rd, with N.A. 0.60 to 0.63. With a low power eyepiece it will do the work of a 16 mm. objective and with eyepieces 10x and 15x it will show as much as will the ordinary 4 mm. or 1.6th. Its N.A. is as high as that obtained in practice with a 4 mm. of 0.85 since this latter objective can be rarely used at full aperture. With a central stop in the substage carrier it gives with a good condenser an excellent dark field and there is no necessity to change to a special condenser. Again the fluorite 3 mm. or 1-10th oil immersion objective which has an initial magnification of about 72 and N.A. 1.30 suffices for the most critical work in medicine and biology. It can be used with eyepieces of 20x and 25x and will work through the thickest No. 2 coverglasses.

W F Harvey

SEGRE (Elio) Sulla sopravvivenza di alcuni batteri asporigeni in tubi chiusi alla fiamma. [Duration of Life of Sealed Cultures of Asporogenous Bacteria].—*Patologica* 1928. July 15. Vol. 20. No 441 pp 361-363 [18 refs] [Inst. of Path. Univ. Cagliari.]

The strains of organisms studied had been sown on ordinary peptone agar made with Liebig's extract and the culture tubes sealed in the flame after 48 hours incubation. They were kept protected from light. The organisms which were still alive and had preserved their cultural and serological characters after about 4 years were one strain of *Corynebacterium diptheriae* one of *Past. pestis* one of *Bact. dysenteriae* (Shiga) and one of *Br. melitensis* B. One strain of *Br. melitensis* B had preserved also its pathogenic properties. Seven strains of *Br. melitensis* and five of *Br. abortus* failed to grow.

W F Harvey

MAXWELL (James L.) The Question of Billvaccines.—*Chine Med. J.* 1928. Sept. Vol. 42. No. 9 pp 682-692.

The writer referred the question of the utility of billvaccines to authorities in Great Britain and America. Their replies are distinctly non-committal or adverse. Most of the article however consists of evidence of a more positive character obtained from South Africa and from the document of the League of Nations, Health Organization (C.H.662) on this subject (see this *Bulletin*, 1928, p 312).

W F Harvey

SHAWBY (J H.) & BONKELL (H E.) On Skin Colour.—*Med.* 1928. Apr. Vol. 28. No. 4 pp 60-64 With 3 text figs.

The general purpose of the investigation described in this paper was to obtain quantitative measures of the differences between the colour of the skin in different races of mankind. The method was to project light through Wratten filters so that a beam of a definite wavelength was thrown on the skin. The proportion which was reflected was measured with a Trotter photometer. A white surface was substituted for the skin, and this gave the measure of the total

illumination the proportion reflected being known the amount absorbed was obtained by subtraction. The authors point that there is an objection to this method it gives no information about the penetration of the light into the different layers of the skin and what happens to that portion which penetrates.

Measurements were made on 200 Europeans 35 negroes and 32 half castes. When the skins were studied in white light it was found that the negro reflected 30-40 per cent. of the light which was reflected by the same part of the body of a European. Examinations were also made in approximately monochromatic red and green lights. It is interesting that the proportion of red or green to the total amount affected was roughly the same in negroes and Europeans it stands to reason that the total amount reflected was less in the negro

P. A. Buxton.

KÜMMELL (H.) *Yatren 105 in der Verhütung und Behandlung allgemeiner Magen Darmbeschwerden in den Tropen* [Yatren 105 in the Prevention and Treatment of Common Gastro-Intestinal Affections in the Tropics.]—*Arch f Schiffs u Trop Hyg* 1928 May Vol 32 No 5 pp 256-281 [1 ref.] [San Antonio Hosp San Pedro de Macoris Dominican Republic]

After 7 months experience in the West Indies the author finds that in Yatren 105 apart from its well known action in amoebic and bacillary dysentery we have a universal prophylactic and an excellent specific against all intestinal affection in the tropics. [Readers impressed by this statement will consult his paper]

A. G. B.

FISCHER (Otto) *Die Behandlung infektiöser Darmerkrankungen mit Yatren 105* Sammelbericht nebst neuen eigenen Beobachtungen. [The Treatment of Infectious Intestinal Diseases with "Yatren 105" A Review]—*Arch f Schiffs u Trop Hyg* 1928 Apr Vol 32 No 4 pp 187-212. [139 refs.] [Inst. for Ship & Trop. Diseases, Hamburg]

This review deals comprehensively with the use of Yatren in chronic and acute amoebic dysentery and its complications in ulcerative colitis and in other forms of dysentery such as ciliate flagellar and bacillary. With its 139 references it is a valuable repository of information.

A. G. B.

OWEN (D Uvedale) *Clinical Notes*.—*Ann. Trop Med & Parasit.* 1928, June 12, Vol. 22, No 1 pp. 47-52. With 3 figs. on 2 plates. [4 refs.]

The author gives a short account of five cases —

(1) *T gambiense* infection, of which a good plate illustrates the rash.

(2) Mixed leprosy with another good photograph.

(3) Schistosomeiasis with reference to the use of periodide of emetine. This drug was used successfully by the mouth by R. M. GORDON in

14 West African children [this *Bulletin* 1927 p. 178] The author's patient was a native of Dongola, aet. 21 and the treatment was ineffective.

(4) *Fasciola hepatica* in man, in North Wales. The liver was enlarged and tender there was mild irregular fever and an eosinophilia of 68 per cent.

(5) A case of sprue in Nigeria. An African origin of sprue is rare.

A. G. B.

PETRETIAKIS (M.) Urethritide à Pasteurella. [Urethritis due to a *Pasteurella*.]—*Bull. Soc. Path. Exot* 1928. Dec. 12. Vol. 21. No. 10 pp. 839-841

Two cases are described from Alexandria in which, together with a purulent urethritis, cystitis and epididymitis there occurred systemic symptoms. The organism isolated in both these cases from the urethral pus was an ovoid cocco-bacillus with the characters of a *Pasteurella* organism. The author considers that the patients may have been suffering from a general septicaemic condition with urethritis as a simple complication.

W. F. Harvey

RADSMÄ (W.) & JOENÖES (M. I.) Over de dagelijkse schommelingen van de CO_2 -spanning in de alveolaire lucht. [Daily Fluctuations of the CO_2 -Tension in the Alveolar Air.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68. No. 5 pp. 781-801 With 2 plates. [9 refs.]

Further investigations confirm Radsma's findings (published in the same journal, 1928 v. 66 p. 95) that the CO_2 -tension in the alveolar air falls during the morning and rises again $1\frac{1}{2}$ -2 hours before sunset, being in all cases much higher at 6 p.m. than in the morning. The reason for this phenomenon is not clear. To determine the influence of sunlight the authors investigated the fluctuations of the CO_2 -tension in two persons during an eclipse of the sun and found that in this case the alveolar CO_2 -tension did not show the usual drop.

Taking into consideration that basal metabolism rises gradually during the day while the CO_2 -tension falls the authors thought that the cause of the latter might lie with the increased ventilation of the lungs. This was confirmed by registration of respiratory movements. The basal-metabolism was estimated in five people and found to be lower than the figures given by BENEDICT which is in accordance with the usual findings in the tropics.

H. Lwow

RADSMÄ (W.) De spanning van het koolzuur in de longlucht bij de bewoners der tropen in vergelijking met die van Europa. [The CO_2 -Tension in the Pulmonary Air in the Tropics and in Europe.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68. No. 5 pp. 802-819 With 10 charts (1 on plate) [16 refs.]

The author studied on himself the CO_2 -tension in the alveolar air in Java and in Holland and found that the typical daily fluctuations

noticed in the tropics (see previous article) did not occur in Holland. He also found in three other persons that the alveolar CO_2 -tension was markedly higher in Holland than in Batavia. While the average alveolar CO_2 -tension in the tropics shows 38.7 mm. Hg in Europe the average CO_2 -tension is 39 mm Hg

H Lwow

ERMILOVA (E.) & KRUCHKOVA (E.) Propriétés biologiques des vibrions isolés de l'eau de Volga de conduite et des égouts [Vibrios of Volga Water]—*Rev Microbiol et Epidémiol* 1928. Vol. 7 No 2. French summary pp 228-229 [In Russian pp. 172-175 5 refs.] [Bact. Lab., Stalingrad]

The strains isolated are capable of division into 5 groups.

1 *V. alcaligenes*.—Motile curved bacilli, Gram negative turning BARSIEKOW'S medium blue in 6 to 11 days not coagulating milk not liquefying gelatin nor inspissated serum non haemolytic not producing indole not agglutinated by *Bacillus faecalis* alkaligenes serum nor by cholera serum

2. Inactive vibrio (Maslennikova).—Small motile curved bacilli Gram negative not changing the colour of BARSIEKOW'S medium not coagulating milk not liquefying gelatin nor inspissated serum not haemolysing dog and rabbit erythrocytes not having any denitrifying action not pathogenic for mice

3 *V. paracholerae*.—Motile curved bacilli Gram-negative turning BARSIEKOW'S medium red coagulating and turning litmus milk red liquefying inspissated serum some strains haemolysing sheep erythrocytes giving positive nitroso-indole reaction not agglutinable by cholera serum some pathogenic for mice

4 *B. aquatilis communis*.—Motile curved bacilli Gram negative turning BARSIEKOW'S medium which contains mannite or glucose red in 24 hrs., but leaving lactose unaffected most strains coagulating milk liquefying gelatin and inspissated serum giving positive nitroso-indole reaction

5 *B. alcaligenes*.—Motile curved bacilli Gram negative producing alkali some strains agglutinated, but below titre by serum of *Bact. faecalis* alkaligenes while the majority are not agglutinated

W F Harvey

LEVADITI (C.) ANDERSON (T. E.) & MANIN (Y.) Le rôle du glutathion dans la production du trypanotoxyl et du bismoxyl. [The Role of Glutathione in the Production of Trypanotoxyl and Bismoxyl].—*Bull. Soc. Path. Exot* 1928. Oct. 10 Vol. 21 No 8. pp. 676-687 [15 refs.]

Levaditi and his colleagues have already suggested that the mechanism by which pentavalent arsenical compounds, such as atoxyl and tryparsamide, and the various bismuth drugs become parasitocidal *in vivo* is due to the formation of metallo-protein derivatives to which they have given the names trypanotoxyl and bismoxyl respectively

British infantry after their quarters were screened and a further comparison is possible with the other British units in adjoining barracks who are not so protected. The figures for other fevers are given as evidence that the low figures for malaria are not produced by transferring to the other fevers group, cases which would formerly have been called malaria.

Year	Average strength	British Infantry		Dengue sandfly influenza and fevers of uncertain origin.	
		Malaria.			
		Admissions	Ratio per 1,000	Admissions	Ratio per 1,000.
1923	558 unproofed	800	850.34	Nd	Nd
1924	460 "	236	482.62	4	8.18
1925	281	160	569.40	17	60.87
1926	302 proofed	55	182.12	Nd	Nd
1927	285	13	45.61	2	7.01

Year	Average strength	Other British Units.		Dengue sandfly influenza and fevers of uncertain origin.	
		Malaria.			
		Admissions.	Ratio per 1,000	Admissions.	Ratio per 1,000
1923	252 unproofed	190	539.77	Nd	Nd
1924	309	85	307.44	4	8.18
1925	334 "	187	470.06	6	21.35
1926	283	197	672.35	1	3.31
1927	391 "	104	265.68	4	14.02

The results are said to raise the question whether the screening of buildings should not be the chief anti-malaria measure for Europeans in the tropics. [These results should impress the value of screening upon British military authorities. Others have been satisfied on the point for years. Boyd (*Amer. J. Trop. Med.* 1926, Vol. 8 p. 157) summarized in *Bull. of Hyg.* 1927 Vol. 2, p. 591) has published evidence which refutes the commonly heard statement 'no screening is better than poor screening']

MÜHLENS (P) La aplicación del verde de Schweinfurt (verde de Paris) en la lucha contra las larvas de los anófeles [Paris Green in Antil-larval Work].—*Geo Med de Caracas* 1928 Apr 30 Vol 35 No 8 pp 120-121

Mühlens summarizes for Venezuelan readers what has recently been written regarding Paris green. He lays stress on the necessity of carefully washing the hands with soap and water after completing work to exclude risk of chronic arsenical poisoning

C Lane

MERTENS (W K.) Mijn ervaring omtrent Stoxal als larvicide middel. [My Experience of Stoxal as a Larvicide].—*Geneesk Tijdschr v Nederl. Indië* 1928. Vol 68. No 7 pp. 1010-1014 [3 refs.]

The larvicide was used in quantities of 0.01 grams per square metre, either pure or mixed with magnesia or talc in a dilution of 1:10. Only when the effect proved insufficient were larger doses employed. But even the tenfold dilution caused a mortality among the larvae (*A. subpictus*) of 25-50 per cent. only. To obtain an equal distribution the undiluted substance could not be used. The larvicide proved non-toxic to fishes even in the ten fold dose.

N H Swellengrebel

ELVERY (P G M) A New Use for Oil Drums.—*Jl Roy Army Med. Corps.* 1928. Aug Vol. 51 No 2. pp. 137-138. With 2 figs.

The title of this paper and the illustrations (see p. 584) tell most of the story. The drums are the ordinary 45-gallon containers. In use as in figure 1 each will boil 40 gal. of water or 519 lb. of potatoes. The rotating dustbin, on being turned over is self-opening and self-emptying and can be made to tip direct into a sweeper's barrow.

J F C. H

BALFOUR (Andrew) The Tropical Field its Possibilities for Medical Women.—*Jl. Trop Med. & Hyg* 1928. Nov 1 Vol 31 No 21 pp. 273-280

An admirable address which deserved to be widely read.

A. G. B

ELKINGTON (J S C.) The Division of Tropical Hygiene Commonwealth Department of Health.—*Health* Melbourne. 1928. July Vol. 6 No 4 pp 100-105

The account is written by the Director of the Division, which is concerned with the wider hygienic aspects of tropical Australia. The paper is not suitable for summary but the following extract teaches a lesson —

By a careful series of systematic observations [to determine the unidentified vector of malaria at Rabaul] covering a large number of feeding observations and dissections Dr Heydon, medical officer in charge of the Commonwealth Laboratory, was able early in 1923 to incriminate definitely *Anopheles punctulatus* Donitz, of which the variety *moluccensis* Swellengrebel is the common local form. Dr Heydon also located all local breeding

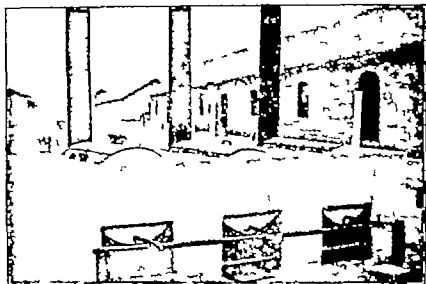


Fig 1 Three boilers made from oil drums for troops' kitchen at Karachi.

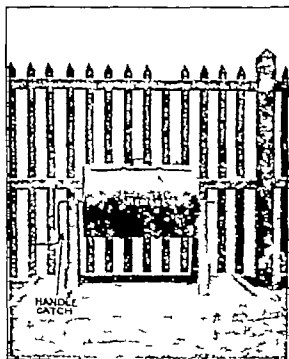


Fig 2 Self-cleaning and self-emptying dustbin made from an oil drum. By lifting up the handle catch and rotating the drum the lid opens and the contents are emptied.

[Reproduced from the *Journal of the Royal Army Medical Corps*]

places of this species and worked out its life history. From being an unsolved mystery the control of indigenous malaria in Rabaul was thus reduced to a simple question of minor drainage and a few pounds worth of labour and kerosene annually.

A. G. B.

CILENTO (R. W.) The Australian Institute of Tropical Medicine, Townsville, North Queensland.—*Health* Melbourne. 1928. July Vol. 6 No 4 pp. 106-111

The history of the Australian Institute of Tropical Medicine since its foundation in 1910 (?) to date is of interest. At first it was administratively under the University of Sydney. In 1911 the Commonwealth took over financial control retaining the University representatives as scientific advisers and new buildings were opened in 1913. In 1921 administrative control passed from the Department of External Affairs to the newly created Department of Health of the Commonwealth. Hitherto it had been a research institute now on the advice of Dr HEISER of the International Health Board it became a central laboratory and administrative headquarters for dealing with the chief health problems of tropical Australia and dependencies. As the more routine laboratory services and special field investigations developed important and definite research problems Dr Heiser wrote they should be taken up by qualified persons attached to the staff. Some of the more important abstract research problems might be transferred to the universities. The author and present director took office in October 1922. The programme then laid down is given and an outline of the subsequent activities.

A. G. B.

PAMPANA (Emilio J.) La medicina tropicale nella Columbia occidentale. [*Tropical Medicine in Western Colombia.*]—*Arch Ital Sci Med Colon* 1928. Vol. 9 No 8. 23 pp. With 1 text fig [18 refs.]

A few of the prevailing diseases are dealt with in this article namely malaria, yaws relapsing fever helminthiasis and some cutaneous affections.

Malaria. The splenic index is high, 66.4 per cent. of the whole population and 35 per cent. of children in Chocó. Of 3125 cases examined, 62.37 per cent. were subtertian 28.55 per cent. benign tertian and 4.54 mixed, 3.94 quartan the remaining 2.6 per cent. were undetermined. Blackwater fever is infrequent, but the few cases which do occur are said to be very grave. Three species of *Anopheles* are found—*A. tarsimaculatus* *A. albimanus* and one intermediate between *A. hyalophilus* and *A. neoai*. Paris green could not be used for extermination because of the difficulty of obtaining a dry vehicle in so damp a climate. The chief means of dealing with the menace is by bonification.

Yaws is common syphilis is rare. The author has seen only one case of goundou gangosa is more frequent and goes by the name of bubón de Belez. Ticks *O. talaje* and *O. venezuelensis* are believed to carry infection. Relapsing fever with the same vectors is fairly common also.

Faecal examination of 336 individuals showed that the chief helminth infections were *Trichuris* (66.9 per cent.) *Ancylostoma* (81) *Ascaris*

(57-6) multiple infection was common, all three being found in 32 per cent. of cases. *Eutamias histolytica* was found in 26 per cent. and *Balantidium* in 1.5 per cent. Beriberi and pellagra, though they exist, are very rarely seen the latter in the interior of the country. Other conditions present which receive passing mention are punta, paedra, mango toe, sporotrichosis and mossy foot. Cases of elephantiasis are usually introduced the author has met with only one patient in whose blood he found filarial embryos. [Cf WESTPHAL, this Bulletin Vol 24 p. 56]

H. Harold Scott.

FERRÓS IZERN (A.) Infantile Morbidity and Mortality in Porto Rico.—*Porto Rico Rev of Public Health & Trop Med.* 1928 May Vol. 3 No 11 pp 461-467 With 1 text fig

Of 39,376 infant deaths which occurred in Porto Rico during 1922-27 31 per cent. were attributed to diarrhoea and enteritis, 18 per cent. to respiratory diseases and 17 per cent. to congenital debility tetanus neonatorum accounted for 6 per cent. and malaria for 3 per cent. The author is forced to conclude that the dietetic regime in infancy is fundamentally wrong among the large majority of the Porto Rican people and this belief is strengthened by a comparison of the mortality distribution within the first year of life with that of New York.

Age groups	Relative mortality 1924	
	New York	Porto Rico.
Under one day	25.7	4.53
One day and under one week	19.4	9.88
One week and under one month	13.4	14.1
One month and under six months	13.9	41.34
Six months and under one year	27.6	29.34
Total	100	100

In Porto Rico the chief incidence of infant deaths is after the first month of life i.e. when artificial feeding comes into use.

A. G. B.

LAMBERT (Robert A.) School of Tropical Medicine of the University of Porto Rico under the Auspices of Columbia University. Review of Research carried out in First Two Years 1926-1928.—*Porto Rico Rev of Public Health & Trop Med.* 1928, Sept. Vol. 4 No 3 pp 107-116

The diseases which have been the chief subjects of research are sprue, schistosomiasis, filariasis, intestinal infections and tuberculosis. An analysis of the native dietaries is in progress. The author writes—

That tuberculosis is responsible for more deaths than any other single infection in many tropical countries is a fact not generally recognized and one whose study has hardly been touched. No better place for its investigation could hardly be found than Porto Rico where the death rate from tuberculosis is some three times as great as that of continental United States, and where the cities show a rate nearly five times that of New York."

The Rickets Commission of Child Welfare of the U.S. Department of Labour made an intensive and sociological investigation which included the physical examination of 700 Porto Rico children systematic X ray studies chemical analyses of blood and investigation of living conditions. The interesting fact was established that in spite of widespread poverty and malnutrition rickets is practically non-existent on the island. A list is given of 61 papers published. [It is interesting to note that in 1922 rickets was given as one of the chief causes of infantile mortality in Porto Rico (this *Bulletin* Vol. 20 p. 751)]

A. G. B.

COOMBS (F. S.) Some Remarks on Manganese Treatment of Pneumonia—*Med. J. Australia* 1928. Aug 11 15th Year Vol. 2. No 6 pp 175-177

The author writes with enthusiasm of this method of treatment of pneumonia. Here we have a cheap reliable and easily applied form of therapy which utterly changes the prognosis but he admits that his experience is limited. The technique is as follows —

The solution consists of 0.12 gramme (two grains) of potassium permanganate (pure) dissolved in 568 cubic centimetres (one pint) of water comfortably hot (40-6° C). If cold it causes rectal irritation and is not well retained. The solution must be fresh.

The dosage is from 90 to 300 cubic centimetres (three ounces to ten ounces) according to the age of the patient. The injection is given *per rectum* slowly by means of a funnel and tube of small bore the patient being in dorsal decubitus or on the side with the buttocks raised by a pillow.

Injections are given every two and a half to four hours for the first twenty four to thirty-six hours the interval between injections is judged by the day of disease on which the patient comes under treatment. The earlier the patient is seen the longer the interval between injections and *vice versa* and again the less the injections are retained the more frequently they must be given. Once temperature reaches normality in older children and adults then give two injections every day for three days and one a day for three more days.

The results of treatment may be described as follows

- 1 Breathing becomes easier deeper and slower in a few hours after the first injection
- 2 Cough becomes freer softer less tearing in character
- 3 Sputum becomes less tenacious and easier of expectoration in twenty four to thirty-six hours
- 4 Cyanosis gives place to a healthier hue
- 5 Sleeplessness is no longer a worry and sedatives are only rarely needed.
- 6 The rusty sputum is early replaced by a white frothy expectoration, though this may be ushered in by a small haemoptysis of no ill-omen, though sufficiently alarming if not expected.
- 7 The temperature drops usually within a few hours after the first or second injection and if it does take a few days to reach normal, at any rate it strikes a lower level, with definite decrease in toxicity and great comfort to the patient.
- 8 Appetite returns even before normal temperature

If the patients are allowed home too soon there is a big risk of relapse. Eight cases out of 19 are described. The potassium permanganate must be chemically pure. Tabloids are suggested. The rationale is uncertain.

A. G. B.

VENEZUELA GULF OIL COMPANY Hospital of Venezuela Gulf Oil Company Second Annual Report, 1927 [Cook (W W)]—61 pp. With 1 plate. Maracaibo Venezuela.

In the report of this Hospital, to which seven medical officers are attached, an account is given of construction work undertaken during the year. There were 1,283 admissions and 16 deaths. There are six articles or reports on tuberculosis for the use of sufferers, on the feeding of infants in warm countries on a malarial survey on the oral administration of antityphoid vaccine and on acute amoebiasis as a complicating factor in acute surgical conditions. The last contains matter of general interest, though the data are not very complete. A number of cases are described, and it is concluded that in a total of 77 cases of appendicitis *Entamoeba histolytica* was found ten times in the appendix and ulcers of dysenteric type 6 times a total of 16 cases or 20.6 per cent. in which *E. histolytica* was believed to be the cause of the inflammation. The author (W W Cook) suggests that bismuth, pateren or emetine should be employed in all abdominal surgical cases without contra indications where fever does not promptly subside 36-48 hours after operation. The diseases treated are classified and a laboratory report shows microscopical and serological activity

A. G. B.

WUPPERMAN (R. C.) A Review of Twelve Months Surgical Work at the Colonial Hospital, Port-of-Spain.—*Jl Port-of-Spain Med. Soc* 1927 pp 19-28.

The author dealt with abdominal and pelvic surgery

A. G. B.

MARTINI (E.) Betrachtungen zur Epidemiologie der Malaria und der Syphilis, [Epidemiology of Malaria and Syphilis].—*Dermat. Wochs.* 1928. May 12. Vol. 83. No 19 pp. 640-643.

The author first suggests that the rate of increase of the proportion of infected persons in a population may be represented by the expression $\frac{d}{dt}(1-u) = -qu$ where u is the proportion actually infected (presumably at time t) q a constant measuring the "infectiousness" of the disease and q another constant measuring the reversion rate from the infected to the uninfected state. He remarks that when the rate of increase is zero i.e. the proportion of infected persons constant, $1-u = q/s$ ($s=0$ would also satisfy the conditions). He continues—"It therefore follows that when there are only 50 per cent. unaffected a reduction to one-half of the mean duration of sickness (infection) must lead to 100 per cent. of healthy persons or the disappearance of the disease. If 80 per cent. were healthy a reduction to $4/5$ th of the mean duration of sickness would suffice to reach the goal." Hence it would appear that an intensive endemic is extremely stable and hard to reduce, while an endemic affecting only a small proportion of the population must be extinguished by a slight variation of the conditions which is unfavourable to it." As this, however does not seem to be in accord with facts, the author discusses possible explanations. [Another possible explanation is that the author has altogether misunderstood the mathematical writings of Sir Ronald Ross which he cites—without

exact reference. It is undoubtedly true that 50 must be multiplied by 2 to turn it into 100 while it suffices to multiply 80 by $5/4$ to reach the same answer. But it is not true that these arithmetical operations throw any light at all upon what happens when we vary the parameters of the integral of $du/dt = au(r-u) - qu$. The author should before embarking upon further quantitative epidemiological voyages make a more detailed study of the papers of Sir Ronald Ross and Dr Hilda HUDSON*]

M. Greenwood.

VAN STEENIS (P. B.) *Pyomyositis tropica*. (Voorloopige mededeeling) [*Tropical Pyomyositis*.]—*Geneesk Tijdschr v. Nederl. Indië*. 1928. Vol. 68. No 4. pp 533-546 With 2 charts. [10 refs.] [Military Med. Lab. Weltevreden.]

The author describes as a clinical entity with report of 4 cases an acute febrile disease, in the clinical picture of which inflammation of the muscles either single or multiple, predominates. Early in the course of the disease abscess occurs in the pus of which common staphylococci are found besides a gram negative coccobacillus. In cultures made from the pus the latter is invariably overgrown by the staphylococcus. Rabbits injected with the pus sometimes became ill and died. Two strains of the gram negative coccobacillus could be obtained from the organs of these rabbits. Their cultural properties are described in tabular form. Blood cultures from the patients remained sterile and the blood was not infectious for rabbits either. The coccobacillus is not agglutinated by the patients serum. Various authors are quoted, who describe the occurrence of the same disease in Tonkin, West and Central Africa and British Guiana. [The reviewer saw at least 12 cases of this disease in Sumatra.]

W. J. Bals.

MESNARD (J.) *Le typhus exanthématique au Tonkin*. [*Typhus Fever in Tonkin*.]—*Arch. Inst. Pasteur d'Indochine* 1928. Apr. No 7 pp. 3-19 With 12 charts & 1 map. [8 refs.] [Summary appears also in *Bulletin of Hygiene*]

The presence of typhus in Annam was first reported by YERSIN and VASSAL in 1908. After exclusion of malaria, enteric kala azar and dengue the diagnosis was based on the cyclical character of the temperature conjunctival injection and transmissibility to man by the patient's blood after an incubation period of 14-21 days.

In July 1921 COPPIN described an epidemic in the prison at Hanoi resembling typhus with a mortality of 16 per cent. Since then the diagnosis of typhus seems to have been excluded in Tonkin although the cold season gave rise to an outbreak of cases of undetermined fever every year. A laboratory examination consisting in inoculation of guinea-pigs and the Weil-Felix reaction, instigated by an epidemic which occurred in the Central prison at Hanoi in March, 1926 led to the conclusion that the outbreak was one of typhus.

Systematic investigation of sporadic cases which was continued for the rest of the year and during 1927 revealed the presence of 96 cases

* *Proc. Roy. Society Series A* xcii 1915 p 204 xciii, 1916. p 212 and p 225.

of typhus among the Annamites and 14 cases among the Europeans. With the exception of 5 children 2 of whom were Europeans and 3 Annamites, all the patients were adults. The mortality among the sporadic cases was very low there being only 2 deaths among the Annamites and 1 among the Europeans, while there were no fatalities among the children.

As regards the cases in the prison at Hanoi where the mortality was high, the agent of transmission of the disease was undoubtedly the louse as all the prisoners were lousy and the epidemic came to an end as soon as disinfection was carried out.

The louse was probably also responsible for the sporadic cases, the Annamites of the poorer classes being frequently lousy. Children probably play an important part in the aetiology of typhus, for as a rule their attacks are very mild and usually escape notice.

J. D. Rolleston.

STIVEN (H. E. S.). Splenectomy for Egyptian Splenomegaly — *London Hospital Gaz.* 1928 June. Vol. 31 No. 8 pp. 225-227
With 2 figs. on 1 plate.

The author who is Principal Medical Officer of the Egyptian Government Hospital Port Said, has done 285 splenectomies in six years with an immediate mortality of 13.4 per cent. and a total mortality within 2 or 3 months of 24 per cent. A questionnaire resulted in good reports from 64 per cent. [period since operation not stated]. The majority of the patients were between 15 and 25 years. The spleen weighs on an average seven times the normal and any treatment but excision is useless. If the patient comes from a malarious district operation is refused. The faeces invariably show *Schistosoma mansoni* and many other parasites may be present. The preparation of the patient is of such importance that it is given here in the author's words —

When a patient is admitted for splenomegaly with a view to operation he is given, as a matter of routine a dose of carbon tetrachloride varying from 2.00 to 4.00 according to age a full course of tartar emetic intravenous injections 0.1., every two days for twelve injections and a course of six injections of 606.

They take a mixture of rhubarb and soda for the first week, which is a splendid cleanser of the intestinal tract, and subsequently they are given a mixture of iron and arsenic and a full nourishing diet including Fool Nabit, that is beans which have been allowed to germinate 48 hours in water. These are then cooked quickly for four or five minutes in a good soup. They have a remarkable effect on the pellagrous cases which, I take it, are cases suffering from a vitamin deficient diet. This course of treatment generally lasts from five to six weeks, when the patient is greatly improved in general health and can stand the shock of operation.

The evening before operation the patient is purged and given an injection of pneumococmic vaccine. This is essential as, failing this, the patient will almost certainly die from pneumonia after the operation. In fact about 5 per cent. get pneumonia in spite of the vaccine but with another dose of vaccine they generally pull through. A dose of morphine and atropine is given half an hour before the operation."

The operation is done under stovaine and for the details the paper must be read.

A. G. B.

PETRIDIS (Pavlos) La splénomégalie égyptienne. [Egyptian Splenomegaly]—*Presse Méd* 1928. May 2. Vol. 38. No 35 pp. 546-549 With 2 text figs. [9 refs.]

The author has studied six cases of this disease at Alexandria and making use of the complete studies by DAY FERGUSON & RICHARDS gives a full account of the affection so common at Cairo that FERGUSON found it in 10 per cent. of autopsies at Kasr El Aini. The author's spleens were examined by ASKANAZY of Geneva, who drew his attention in 1924 to the fibro-siderotic or sidero-mycotic foci [this *Bulletin* Vol. 25 pp. 163-5] DAY found in a series of cases that the liver contained bilharzia ova [vol. 21 p 938] Petridis confirms this and figures such an ovum. The conclusion is that Egyptian splenomegaly has a dual aetiology bilharzial and mycotic. ASKANAZY however regards the aetiological rôle of the fungus as uncertain till the disease has been produced experimentally.

A. G. B

AVERY (Samuel D.) Diphtheria Control.—*Proc. Med Assoc Isthm Canal Zone* 1927 Vol. 15 pp. 45-52.

The author gives tables of the incidence of diphtheria in the Canal Zone Hospitals from 1906 to 1925 and of diphtheria in Panama City in 1925 1926 and 1927 In 20 years on the Canal Zone 252 cases were admitted to hospital. Of these 41 per cent. were of pre-school age (1 to 5 years) 36 per cent. of school age and 23 per cent. of adult age (18 years and upwards) These percentages show that control measures cannot be limited to any one age group The measures on the Zone have consisted in prompt isolation of all positive and also all suspected cases they appear to be sufficient. In Panama city where conditions are less favourable there were in the 3-year period 338 cases with 16 deaths 77 per cent. of cases among the black population and 23 per cent. among the white. Moreover in the 20-year period there were 7 deaths in the Zone against 85 for Panama. In Panama there was a marked increase in the 3-year period, 54 105 179 It is concluded that the protective measures are not adequate and that other measures such as toxin antitoxin immunization may be desirable.

A. G. B

PEIRRIER. Etude sur la composition du n'sou, poison indigène employé au Cameroun. [The Composition of N'sou, a Native Poison employed in the Cameroons.]—*Ann de Méd. et de Pharm. Colon* 1928. July-Aug-Sept. Vol. 26. No 3 pp. 299-304

N'sou consists of leopard's feelers cut small and impregnated with an extract made from a mixture of vegetable poisons. It is said that the hairs are spread on the victim's chair or bed the poison enters through unnoticed lesions of the skin and death follows in 6-12 hours. There are ten ingredients of the extract according to the author's analysis of labelled specimens. Two are of animal origin one a toad which secretes venom and can project it to a distance the venom contains two alkaloids one of which acts like digitalin and the other paralyzes muscle the toad [? the whole toad] is dried and pulverized the other is a black scorpion of the genus *Buthus* which is similarly treated. Of the vegetable poisons one is *Erythrophloeum guineense* NO

Leguminosae which is a well-known ordeal poison. The accused drinks a decoction of the bark. If he dies he is guilty. If he vomits he is innocent but he probably dies of the poison later especially since Strychnos bark is often added. The author killed a guinea pig with a watery extract in five minutes. Another vegetable poison was *Pseudorhizoma spinosa* N. O. Acanthaceae, which is known as a fish poison. A third is *Uncaria spinosa* N. O. Euphorbiaceae, used to poison domestic animals, as well as fish. A fourth is the well-known *Strophanthus glaber* N. O. Apocynaceae, the seeds of which are used to poison arrows. A kid on a wound of which fresh poison was laid died in two minutes. Another substance is a bulb of the genus *Croton*, which contains a vesicating principle. Lastly there is a mysterious substance known as Bototo. This is very formidable and its secret is carefully guarded. It is a bark which killed a dog with tetanic convulsions. The author suggests it is curare, furnished by *Strychnos scaya*. From this the fetish men get a draught which is employed in ordeals. The patient has to jump over a stick half a metre from the ground. If paralysis prevents him, he is guilty. [This paper takes us back to the blasted heath of Macbeth.]

A. G. B.

PAGE (Irvine H.) TURNER (Kenneth B.) & WILSON (Jesse H.) The Clinical Significance of Eosinophilia on a General Medical Service. — *Jl Lab & Clin Med.* 1928, Sept. Vol. 13, No. 12, pp. 1169-1116. [75 refs.] [College of Physicians & Surgeons, Columbia Univ. & Presbyterian Hosp. New York City.]

The authors' survey was made to determine, if possible, the clinical significance of eosinophilia in a series of hospital cases. By eosinophilia they mean a condition in which there is 5 per cent. or more of eosinophiles in the blood. Of patients admitted to hospital in New York between March 1923 and October 1927 5,500 were medical cases and had at least one complete blood count including a differential leucocyte count from a stained smear. Search for ova and parasites in the stools was made in practically all cases, and repeatedly when eosinophilia was present. The conclusions are as follows —

"1. An eosinophilia of 5 per cent. or more occurred in 300 patients among 5,500 general medical cases, all of whom had complete blood counts and stool examinations. The small number of dermatologic cases seen and the entire absence of scarlet fever patients prevent this series from being wholly representative. Cases of obvious blood diseases were excluded.

"2. Of the 300 cases of eosinophilia in this series, 10 per cent. occurred in parasitic infestation, 13 per cent. in rheumatic fever, 13 per cent. in chronic pulmonary disease (chronic bronchitis, emphysema, asthma), 10 per cent. in the chronic nephritis-general arteriosclerotic group. In fully 40 per cent. the eosinophilia occurred in isolated cases of various conditions and had no diagnostic significance.

"It is suggested from this series that eosinophilia may be a part of the phenomenon of allergy.

There were 31 cases of parasitic infection, 15 of which were trichiniasis. In one of these the eosinophilia reached 81 per cent. In 4 cases of amoebic dysentery the eosinophiles ranged between 5 and 7 per cent. For further details the paper must be consulted. Note the long list of references.

A. G. B.

ONNISON (C. P) **Valvular Heart Disease in the African Native.**—*Kenya & East African Med J* 1928. Sept. Vol. 5 No 6 pp 210-213.

In two years experience of a large native reserve in South Kavirondo Kenya Colony during which 12,000 labour recruits have been in hospital under the author's care he has seen only ten cases with definite evidence of valvular disease. In all the aortic valves were affected never the mitral. Of the ten cases one was due to ulcerative endocarditis one case was diagnosed as aortic stenosis but afterwards developed a diastolic bruit, the rest had signs of aortic incompetence only. All except one of 45 were males between 20 and 30 years. The aortic stenosis patient gave a history somewhat suggestive of acute rheumatism his W.R. was negative. Of the other cases in four instances the Wassermann or Sigma reaction was positive in two negative. Yaws is prevalent in S Kavirondo. In any case syphilis cannot be accepted as the cause of all the heart lesions. The author states that he has never seen a definite case of acute rheumatism, chorea or subcutaneous nodes in an African native. An account is given of the autopsy findings in the case of ulcerative endocarditis. The valves were sclerosed with large vegetations one of which contained a deposit of calcareous salts. Some of the vegetations consisted of chronic inflammatory tissue. The author thinks that this and the presence of calcareous salts suggest chronic endocarditis of rheumatic origin and concludes that rheumatic heart probably occurs in Africans but is rare.

A. G. B.

LLOYD (R. B) **The Wassermann Test in India.**—*Indian Med Gaz.* 1928. Apr Vol. 63 No. 4 pp. 173-176.

Seven years ago the author took charge of the office of Imperial Serologist Calcutta. That laboratory as part of its work, carries out Wassermann tests (W) for the large majority of the Calcutta hospitals and for others in Bengal. The author's extensive experience of a matter of great importance to all doctors, and patients in the tropics is therefore of great interest.

He notes as to syphilis in Bengal that it is extremely prevalent extensive destructive lesions are rare. Often the primary sores show no induration they are frequently phagedaenic they swarm with spirochaetes. Secondary rashes are little in evidence in skin clinics [where they would be the more carefully looked for and the sooner noted] condylomata, however are very common. Later lesions are very noticeable in the Calcutta hospitals. Nervous lesions especially hemiplegia and transverse myelitis and grave cardiac lesions are frequent. Parasyphilitic lesions are seldom seen. Many cases of anaemia with positive W are seen in young men—they do well on anti-syphilitic treatment. The syphilis rate of the Calcutta hospital population is 15 to 20 per cent. As to specificity of reaction it is essential to examine reaction in the common tropical disorders.

Malaria—the author is confident that the method used in his laboratory does not yield a positive result in malarial cases, febrile or otherwise.

Yaws is rare in Bengal. It gives a positive result, but clinically generalized yaws is easily recognized, and treatment is the same as in syphilis.

Leprosy—the one disease of non-spirochaetal origin in which a high percentage of positive W reactions are seen.

It is essential to devise a serological test for syphilis adapted to the peculiar case of leprosy. If a technique (Kolmer's) affording a wide gap between the antigenic and anti-complementary doses of the antigen employed be used, leprosy gives a negative W reaction provided syphilis be absent. The author so far has found Kahn's flocculation reaction satisfactory for testing sera of leprosy patients. He has noted a tendency for weak positive W to be given by sera of pregnant women—strongly positive W means syphilis (apart from leprosy and yaws). Kolmer's wide-gap technique excludes the weak positive W of pregnancy alone. There is a very fatal *anaemia of pregnant women* in Bengal. Though Dr Margaret BALFOUR has found less than half of these women's sera gave positive W yet syphilis may be the basis of some of these cases.

Blood transfusion—now a frequent operation in Calcutta. Besides blood group determination, every donor is examined for W reaction and, if positive, rejected. He considers the W test the best for diagnosis of syphilis in the East, as performed in central laboratories by a trained skilled staff. In hot weather it is best to send the tubes of blood for testing in a box of sawdust impregnated with ice and salt. Blood drawn in hot weather becomes completely haemolysed in two days. Stale serum too may become highly anticomplementary probably owing to bacterial contamination.

H. M. Hanschell

MANAI (Andrea). Le alterazioni della crasi sanguigna nel favismo. *Blood-Changes in Favismus. —Haematologica.* Pavia. 1928. Vol. 9. No. 4. pp. 369-380. [7 refs.] French summary p. 381. [Inst. of Path. & Clin. Med. Univ. Sassari.]

Five cases of favismus are recorded from the haematological aspect. The patients were usually seen and examined for the first time some days after the onset of symptoms. The red cells were reduced to between one and two millions and showed marked anisocytosis, with preponderance of microcytes together with several nucleated corpuscles—the haemoglobin was even more reduced, giving a low colour index (0.7-0.9). The leucocytes were always found increased, and in one with erythrocytes 1 000 000 the leucocytes were 28 800 per cmm. of which the polymorphonuclears constituted 68 per cent. (in some of the patients they were as high as 80 per cent.)

The symptoms of favismus have been ascribed to anaphylaxis. Experiments were carried out on rabbits sensitized by fresh extract, by the gastric route in two groups, intravenously in another group. Examination was made of their blood before the anaphylactic shock, and again during the shock. In all cases the red and white corpuscles were reduced, the former by about 40 per cent. the latter rather more. A second examination twenty four hours or more afterwards showed a similar reduction of red cells but a return in the number of leucocytes to normal or even to considerably higher.

It is probable, therefore, that in man also leucopenia precedes the leucocytosis but the patients are not seen until this stage if it occurs, has passed.

H. Harold Scott.

HARLEY MASON (R. J.) The Treatment of Ulcers with Pix Liquida (Stockholm Tar)—*Kenya & East African Med J* 1928. Feb Vol 4 No. 11 pp. 350-352.

As a result of a chance discovery of the value of tar 300 ulcers have been thus treated.

The ulcer is first swabbed out with eusol, any sloughs present are removed and the surrounding skin is cleaned. The tar is spread thickly on a piece of plain white lint which is then applied and covered with a thick piece of wool and a bandage. It is sometimes convenient to pour the tar direct into the wound. For an ordinary dirty ulcer this is left on without changing the dressing for three days. If the ulcer is foul, it is changed after two days. In the case of a large offensive ulcer of the worst type it is changed daily. On removal of a dressing that has been left on for three days the ulcer is found to be filled with very dirty looking discharge but when this is swabbed off the floor of the ulcer is seen to be forming healthy granulation tissue. After three or four days of this treatment the tar is stopped and fomentations are applied three times a day for two days after which the tar treatment is repeated if necessary.

For the more superficial ulcers the first tar treatment will suffice. For deeper ulcers it may have to be repeated once or twice.

Zinc ointment is applied as soon as the ulcer has become half filled with granulations even though still discharging slightly. As soon as the surface epithelium starts spreading in from the edges the zinc ointment is left on for three days without changing in order not to injure the growing epithelium. Rapid progress is obtained in this way.

The treatment has the advantages of cheapness and ease in application, and suits all but a small percentage of ulcers.

A. G. B.

TORRES (Octavio) Tratamento das úlceras chamadas tropicais (produzidas pela associação fuso-espirillar) pelo soro humano seco [Treatment of Tropical Ulcer by Dried Human Serum].—*Arch Brasileiros de Med* 1928. June Vol. 18 No 6 pp 583-585.

Those ulcers in which spirochaetes and fusiform bacilli are found associated the author treats by first cleaning with saline then dusting over with dried serum and covering the whole with banana leaves. Dr AMARAL had previously recommended horse-serum but the author made use of the sera sent up for Wassermann tests pooled them in Petri dishes placed these in an incubator at 37 C to dry and then powdered the product.

H. Harold Scott.

LAGNOV (S.) Le traitement des abcès pulmonaires non amibiens par le chlorhydrate d'émétine. Faits cliniques. Travaux expérimentaux. [Treatment of Non-Amoebic Pulmonary Abscess by Emetine Hydrochloride].—*Ann de Méd* 1928. July Vol. 24 No. 2. pp 223-246.

A report after close clinical study on seven cases of pulmonary abscess (in Bucharest) demonstrating the effective curative action of emetine hydrochloride. The sputa of these cases revealed a polymorphic microbic flora. No amoebae were found. In three cases spirilla were found, but no selective action of emetine on the spirilla can be claimed for the drug was equally effective in the four cases without spirilla in the sputa nor can the spirilla be considered as the

prime cause of the lung abscess. Cure of the seven cases was effected in two to three weeks. The doses of emetine hydrochlor. (daily hypodermic injections) varied from 0.01 to 0.02 centigramme, the total quantity of emetine given per case was from 1 to 1.5 gramme. [These results point to the too frequent diagnosis of amoebiasis because of, and only because of recovery after emetine therapy]

H. M. HANACHEL

MCCARRISON (R.) Studies on Lathyrism. Part II.—*Indian J. Vet. Res.* 1928. Jan. Vol. 15. No. 3. pp. 797-800. With 7 charts (21 figs.) [1 ref.]

The object of these experiments was to learn whether or not a morbid state resembling lathyrism could be produced in rats by means of diets consisting largely of *khesari* or *akta* [see this *Bulletin*, Vol. 22, p. 985], and the conclusion reached was that neither the pure culture of *Lathyrus sativus* (*khesari*) nor of *Vicia sativa* (*akta*) nor the *khesari* used by sufferer from lathyrism in Rewah caused lathyrism or any disease of the nervous system in rats. For rats lathyrus is superior to whole wheat flour *vicia inferior*.

A. G. B.

RICOE (D) Six cas de tétanos infantile traités par le sérothérapie (ancien sérum antitétanique de l'Institut Pasteur) suivis de guérison. Six Cases of Recovery from Tetanus in Children treated by the Old Antitetanic Serum of the Pasteur Institute.]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 73-84. [3 refs.]

The ages of the six children ranged from five to seventeen years and their cases are given in some detail. The author reports these because (1) though the cases were acute and with a relatively short incubation period in weakly children serotherapy was usually the only treatment (2) the doses were moderate, and given daily for a fortnight or longer (3) the routes used were the subcutaneous and intraspinal only. The doses were 40 to 60 cc. subcutaneously and 10 to 20 by the spinal cord. The serum in question is compared with some other preparations.

A. G. B.

D'AMATO (Lungi). Su di una nuova emodiagnosi delle infezioni tifoidi e della infezione mediterranea mediante la reazione emoclastica. [The Haemoclastic Reaction—a New Method of diagnosing Infection by *Bac. typhorum* and *Br. mediterranea*.]—*Riforma Med.* 1928. Jan. 9. Vol. 44. No. 2. pp. 32-33. [3 refs.]

The author finds that the injection of a small quantity (3-5) of the dose of the vaccine used for prophylaxis produces in a patient a haemoclastic shock, evidenced by a fall in the leucocytes. The mode of applying the test is. The white corpuscles are counted and the provocative dose is injected, corresponding to about 20-30 millions of bacilli. After half an hour the leucocytes are again counted. A fall of 1,000 or thereabouts is designated + (800-900 doubtful ±) of 2,000 strong positive ++ of 3,000 or more very strong positive +++

In 48 cases of undulant fever he found 12+++ 30++ and 6+ in 39 cases of enteric fever (*B. typhosus* infection) 6+++ 24++ 9+ In neither group was there a negative nor a doubtful. The reaction was specific. 40 patients with undulant fever were injected with typhosus vaccine in three the results were doubtful \pm 27 negative of 26 enteric patients injected with melitensis vaccine 24 proved negative and two were doubtful.

H. Harold Scott.

MOSES (Arthur) Epidemiologia e prophylaxia da febre typhoide—Da vacinação antityphica por via oral. [Oral Vaccination in Typhoid Fever]—*Ann Paulist Med e Cirurg* 1928. Nov-Dec. Year 14 Vol 17 No 11-12 pp. 159-167

The author reviews some of the literature of oral vaccination and believes in the value of BESREDKA's bile vaccine. As regards human beings he does not produce much evidence. As the result of laboratory experiments on animals with emulsion of typhoid bacilli destroyed by heat he has obtained an agglutinating serum of titre from 1-20 to 1-5 000 [v this *Bulletin* Vol 20 p 747 (PIRIE DUBINSKY) Vol 21 p 451 (STIBBE)]

J H Tull Walsh.

PACHECO (Genesio) Um caso de infecção humana por bacillo proteo (*Proteus americanus* n. sp.) [A Case of Human Infection by a *Proteus* Bacillus].—*Sciencia Med.* 1928. Mar Vol. 6. No 3. pp. 132-144 With 1 chart in text. [8 refs.] English summary pp 144-145.

The patient had symptoms of an affection of the liver with concomitant general infection. Blood culture gave on two occasions a *Proteus* bacillus. The serum of the patient agglutinated the isolated organism in high titre and was still highly agglutinating three months later. The organism was closely related to *Proteus mirabilis* but differed in the production of a massive non-contracting coagulum in milk without gas formation. Saccharose, sorbite and galactose were not fermented.

W F Harvey

MAGNALT (A. Salisbury) An Investigation of Lymphadenoma with Relapsing Pyrexia.—*Ministry of Health. Reports on Public Health & Med Subjects* No 50 pp vi+86. With 6 charts & 3 plates. 1928. London H.M.S.O. [1s 6d.]

This account of a rare disease is of interest to our readers because the relapsing pyrexia may lead to a diagnosis of one of the fevers of the tropics especially when there is no enlargement of superficial glands. It is suggested that the disease is not as rare as it is believed to be. A case of Egyptian origin (MANSON BARR & GILL, this *Bulletin* Vol 21 p. 473) has it would appear been overlooked by Dr MacNalty. SEYFARTH's paper on three cases was probably published too late for inclusion (*L.c.* Vol 25 p 391)

A. G. B.

SANTESSON (C. G.) Ein Pfeilgift mit Herzwirkung aus Südamerika (Columbia) [An Arrow Poison acting on the Heart, from Colombia].—*Acta Med. Scandinavica*. 1928. Vol. 68. No. 3-4. pp. 287-304. With 4 text figs. [12 refs.] [Caroline Med. Chirurg. Inst. Stockholm.]

The poison in question was brought home by a traveller who described its collection from a tree, *pakuri*, the botanical name of which is not known. It is used by the Indians in hunting not apparently in war. Nothing is known of the symptoms produced, nor of its effect on man. The author experimented with the sample. It contained a glucoside which killed frogs and rabbits with the heart in systole its action on fowls and mice was much less. He believes that this is the first report from the New World of an arrow poison acting on the heart.

A. G. B.

GROSS (Martin) Zur Kasuistik des Ulcus molle serpyginosum. (A Case of Ulcus Molle Serpyginosum).—*Dermat. Woch.* 1925. Feb. 7. Vol. 80. No. 8. pp. 205-215. With 7 text figs. [Numerous refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

A detailed report of a case as designated above which resisted all treatment surgical and medical, general and local for over a year. Although there was some improvement shown with the initiation of each different therapeutic measure the success was not lasting. Injections of an autovaccine (strepto-bacillus Ducrey) met with more success than anything else until healing eventually occurred after complete removal of all affected tissue down to healthy tissue with the thermocautery.

H. S. Stannus.

HERMANS (E. H.) Ulcus molle, bubonen, lymphogranuloma inguinale en climatische bubonen. [Ulcus Molle, Buboes, Lymphogranuloma Inguinale and Climatic Bubo].—*Nederl. Tijdschr. v. Geneesk.* 1928. Sept. 16. 72nd Year. 2nd Half. No. 37. pp. 4526-4536. With 1 chart. [20 refs.]

For the differentiation of the affections mentioned in the title the author uses two cutureactions and arrives at the following conclusions —

(1) In the intracutaneous injection of Dmelcos (a French preparation of Ducrey's bacillus) we have at our disposition an important aid in the diagnosis of ulcus molle and its complications. Administered intravenously this preparation is also of great therapeutic importance.

(2) Lymphogranuloma inguinale antigen, prepared after Fxerl, causes a specific reaction. The results justify the opinion that lymphogranuloma inguinale is identical with climatic bubo.

(3) In patients with a positive cutureaction to Fxerl's antigen, subcutaneous injection of the same preparation often yielded excellent therapeutic results.

(4) The author separates a group of bubonic affections from the rest. This group shows a specific reaction to an antigen which he calls lymphogranuloma inguinale antigen II. In adequate cases also this antigen may be used therapeutically.

(5) Two cases of jaundice which occurred respectively after intravenous treatment with Dmelcos and after intracutaneous application of FREIS antigen may serve as a warning against similar complications and their possible significance

W J Bais.

VERGE (J) Les maladies communes à l'homme et aux animaux. I. La mélioiidose. [Diseases Common to Man and Animals. I. Melioidosis.]—*Rev Gén de Méd* 18 1928. Nov 15 Vol. 37 No 443. pp 623-626 [7 refs.] [Summary appears also in *Bulletin of Hygiene*]

This is a review of the subject of Melioidosis at considerable length and with detail under various heads. The works of STANTON and FLETCHER and of PONS are freely drawn upon and reference made to the discovery of the causative organism by WHITMORE. Melioidosis is a disease which affects the horse dog cat rabbit guinea pig rat and man under natural conditions and which, both in regard to its lesions and its causative organism resembles glanders very closely. Verge and PAIREMAURE have shown that the serum of a glandered horse deviates complement to the same amount in the presence of the bacillus of glanders as of the bacillus of melioidosis. STANTON FLETCHER and SYMONDS (see this *Bulletin* 1928 p. 382) have published a case of melioidosis in a horse. The lesions are necrosis caseation and abscess formation. When the *Pfeifferella whitmorei* is injected intraperitoneally in the male guinea pig it gives rise to an orchitis which is a diagnostic character of the glanders bacillus. The natural mode of infection is by ingestion and very probably by contamination of food by rats or other infected rodents.

W F Harvey

RAO (G Raghunatha) A Case of Spontaneous Rupture of Enlarged Spleen.—*Indian Med Gaz* 1928 May Vol. 63 No 5 p 273

This case was diagnosed on symptoms. There was no autopsy

A. G. B

ROMITI (Cesare) Contributo al trattamento chirurgico della elefantiasi. [The Surgical Treatment of Elephantiasis.]—*Arch Ital di Chirurgia* 1928 Vol 20 No 6 34 pp With 29 figs

This is a fuller version of the (English) paper summarized in this *Bulletin* Vol. 25 p 383. It is well illustrated

A. G. B

BERNARD (P Noël) Les Instituts Pasteur d'Indo-chine.—*Arch Insts Pasteur d'Indochine* 1928 Apr-Oct. No 3 & 4 pp 3-6

CAMACRO (Leovigildo) Un caso monstruoso de elefantiasis del escroto.—*Med Paises Cálidos* Madrid. 1928 Jan. Vol. 1 No 1 pp. 74-76 With 2 text figs

DEL FAVERO (Ernesto) Il quadro ematologico come criterio differenziale diagnostico delle più importanti malattie esotiche.—*Ann di Med Nov e Colon* 1928 Mar-Apr Year 34 Vol. 1 Nos. 3-4 pp 150-189 [37 refs.] [Lab Exotic Path. R Univ. Padua.]

DURON Note sur l'hygiène et la santé des enfants européens au Congo belge.—*Ann Soc Belge de Méd Trop* 1928 June Vol 8 No 1 pp 117-120

- GROEN (Sodhamoy) The Scientific and Economic Importance of Research on Indian Medicinal Plants.—*Indian Med. Gaz* 1923. Nov. Vol. 63. No. 11 pp. 830-833.
- GOLLINI (Amedeo) Quelques considérations sur le fonctionnement de l'hôpital des nègres à Cogninville et d'autres services médicaux de la ville.—*Arch. Ital. Sci. Med. Colon* 1927 Aug. Vol. 8. No. 8. pp. 442-451.
- HOWELL (A. T.) A Case of Exophthalmic Goitre in a Meru Native.—*Kenya & East Africa Med. J.* 1923. Sept. Vol. 5. No. 6. p. 184.
- ISMAIL (Abd-El-Karim) Aetiology of Hyperplasia in Egyptians.—*Lancet*. 1923. Aug. 11 pp. 275-277 [1 ref.].
- JEANCRINE & HOROWITZ Un cas d'éléphantiasis de la jambe des pays chauds.—*Bull. Soc. française Dermat. et Syph.* 1923. July No. 7 pp. 849-852 With 1 text fig.
- DE LASTOURS (Fougerat de David) L'hygiène solaire aux colonies.—*Rev. Méd. et Hyg. Trop.* 1923. Sept.-Oct. Vol. 20. No. 8. pp. 133-144 With 4 text figs.
- LE DANTEC Histoire succincte de la fondation de la chaire de médecine coloniale et de clinique des maladies exotiques auprès de la Faculté de Bordeaux.—*Jl. Méd. de Bordeaux* 1928 Nov. 10 Vol. 103. No. 22. pp. 897-898.
- LEGENDRE (J.) & D'ARVIMOND (L. Philepeau) Traitement de la pneumonie des noirs, par les sérum antivenéreux et antituberculeux.—*Bull. Acad. Méd.* 1929 Jan. 29 Year 83 3rd Ser. Vol. 101. No. 4. pp. 142-145.
- LEGER (Marcel) L'Institut Pasteur de Dakar.—*Presse Méd.* 1923. July 7 Vol. 26. No. 34 pp. 861-862 With 3 text figs.
- LODATO (Gaspero) Si deve immettere un mal di mchana per i nazionali che prestano servizio presso reparti mchana coloniali?—*Arch. Ital. Sci. Med. Colon* 1927 July Vol. 8. No. 7 pp. 383-392. [Inst. of Trop. Path. Univ. Bologna.]
- MATSUMA (Fuyuko) Die experimentelle Untersuchung der Emetin- und Cephaelinintoxikation.—*Scientific Reports Govt. I et I Inst. Des. Tokyo*. 1927 Vol. 6 pp. 469-475.
- OLIVARES (Rafael) Elefantiasis del escroto.—*Mé. Paises Calidos. Madrid*. 1928 May Vol. 1. No. 3 pp. 261-269 With 3 text figs.
- SERVIDORI (Gennaro) Breve notizie geografiche sulla Somalia Italiana (Zona di Senale).—*Arch. Ital. Sci. Med. Colon* 1923. Oct. Vol. 9. No. 10. pp. 825-829 [Inst. of Trop. Path. Univ. Bologna.]
- SERRACHALAN (T.) Musculo-Spinal Nerve Paralysis following an Intramuscular Injection of Quinine.—*Indian Med. Gaz* 1929 Feb. Vol. 64. No. — pp. 86-87.
- SHATTUCK (George C.) Scoury, Pellagra, and Sprue at the Boston City Hospital.—*New England Jl. of Med. formerly Boston Med. & Surg. Jl.* 1923. Nov. 15 Vol. 189. No. 20 pp. 986-987 [3 refs.].
- SHATTUCK (George C.) Surgical Aspects of a Few Tropical Diseases.—*New England Jl. of Med. formerly Boston Med. & Surg. Jl.* 1929 Jan. 31 Vol. 200. No. 5 pp. 229-231 [10 refs.] [Harvard School of Public Health, & Boston City Hosp. Boston.]
- DA SILVA (J. Ramon) Epidermophytia inguinal.—*Brasil. Medica* 1923. Nov. 10 Vol. 42. No. 45 pp. 1274-1275 With 1 text fig.
- SOCIÉTÉ MÉDICO-CHIRURGICALE DE L'OUEST AFRICAIN FRANÇAIS Réception des membres de la mission maritime de la Société des Nations 29 mars 1928.—23 pp. With 6 figs. 1928. Laval. Imprimerie Barnoud.
- TRAHAUD (J.) Ce qu'il faut entendre par les termes de typho-malaria ou de fièvre typho-palustre.—*Bull. Acad. Méd.* 1929 Jan. 8. Year 92. 3rd Ser. Vol. 101. No. 1 pp. 4-17 With 1 text fig. [1 ref.]
- WILSON (C.) Varicose Groin Glands.—*West Africa Med. Jl.* Lagos. 1929 Jan. Vol. 2. No. 3. p. 184.

REVIEWS AND NOTICES

HEGH (Emile) [Ingénieur Agronome, Lauréat de l'Institut de France, attaché au Ministère des Colonies de Belgique.] *Les Tse-Tsés*. Tome Premier Généralités.—Anatomie.—Systématique.—Reproduction.—Œufs à Pupes.—Ennemis Prédateurs et Parasites. [The Tsetse Flies. Vol. 1.]—pp xiv+742. With 327 figs. & 15 coloured plates. 1929 Brussels. Royaume de Belgique. Ministère des Colonies. (Imprimerie Industrielle et Financière 4 rue de Berlaumont.)

The dominant sensation in the mind of the medical entomologist confronted for the first time with this splendid volume must surely be astonishment, at the munificence with which it has been produced by the Belgian Colonial Office as a veritable *édition de luxe* no less than at the industry of its author. Half bound printed throughout on glazed paper and adorned with exquisitely reproduced examples of Mr TERZI'S consummate skill, this book, could it have made its appearance some sixty years ago might almost have found a place on a Victorian drawing room table in serious rivalry with *Picturesque Europe* or *Costumes in Many Climes*. Having said this, let us forthwith disclaim any desire to be supplant or to disparage—we only wish to indicate to those who may not have seen it how widely M. Hegh's latest work differs in external from the usual type of entomological text-book produced in war-impoorished Britain.

In his Preface M. Hegh explains that in 1923 he was instructed by the Belgian Colonial Office to prepare a new French edition of his little brochure *Notice sur les glossines ou tse-tse* which was compiled and translated from English sources and published in 1915. It was at first believed that requirements would be satisfied by translating with any necessary additions the work by AUSTEN and Hegh which was issued by The Imperial Bureau of Entomology in 1922. After toiling for a few months however M. Hegh came to the conclusion that what was needed was not a *résumé* but a translation *in extenso* or a reproduction of the principal passages in all the important memoirs on the subject of tsetse-flies not merely from the point of view of biology in the strict sense of the term but also in connexion with the anatomy, systematics and geographical distribution of these insects. Labouring with the methodical thoroughness with which all his work is characterized M. Hegh has produced the volume before us the subject matter of which, as printed on its title-page is stated above. Volume II now in course of preparation, will deal with geographical distribution of tsetse flies by species and by colony; habitats of the different species of tsetse; biology of adult tsetse flies; nutrition of tsetse-flies—sources of blood—role of bug game; influence of external agents on adult tsetse; study of possible means of combating tsetse flies—clearing—direct destruction—prophylactic measures etc. methods of collecting preserving and studying tsetse flies.

It need scarcely be remarked that the system of translating "*in extenso*" as opposed to summarising, has the defects of its qualities, and that its merits are not those of conciseness. Thus M. Hegh after printing in full literal translations of the descriptions in AUSTEN'S *Handbook*, in the following chapter reproduces in a similar manner the descriptions of the same species by NEWSTEAD in the latter's *Guide to the Study of Tsetse-Flies* (1924) accompanied in this case be it said, by reproductions of the original figures of the genital armature.

Seeing that the bulk of the work upon and in relation to tsetse-flies hitherto accomplished has been done by Engshahman and described in English, it will be only natural if M. Hegh's book should prove of greater value to Belgian and French than to British workers. In view however of the fact that certain English monographs have long been out of print, while copies of many anatomical and other papers dealing with tsetse-flies must now be exceedingly difficult to procure the faithful translations supplied in this

volumes, accompanied as they are by reproductions of original illustrations will possess real utility even for those whose natural medium of expression is other than French. The various sections of the work are accompanied by extremely useful bibliographies and, although nothing can compensate for the absence of a properly compiled index, the "Table des Matières" at the end of the volume is reasonably comprehensive. Turning to the illustrations the black and white figures, all of which are remarkably well reproduced, include copies of photographs of a large number of breeding places of various species of *Glossina* some of which are now published for the first time. Allusion has already been made to the excellence of the coloured plates among these are copies of the ten plates in Austen's (1911) "Handbook" (by permission of the Trustees of the British Museum), and also illustrations of four species (*Glossina austeni*, Newstead *G. sayaniensis* Austen *G. labaniformis* Westwood and *G. schouti*, Newstead and Evans) which have not previously been figured.

E. E. Austen.

GENERAL GOVERNMENT OF FRENCH WEST AFRICA. African Conference of the Yellow Fever (Dakar—April 1928)—299 pp. With 3 plates. 1929 Paris Imprimerie Militaire Universelle L. Fournier 264 Boulevard Saint-Germain.

This is the official report of the proceedings of an inter-colonial conference on yellow fever held at Dakar from April 23rd to 30 1928, called on the initiative of the Governor General of French West Africa and attended by representatives of the following Colonies: Dakar and Dependencies, Sierra Leone, Nigeria, Gambia, Gold Coast, Togo, Senegal, also the American Commissioner of Lagos, the Alfred Jones Laboratory Freetown, Sierra Leone, and the Pasteur Institute Dakar. Dr LAXTER, Inspector General of the Sanitary Service Colonial Office Paris, was the President.

The intervals between the meetings were occupied by visits to "the principal extinct foci of yellow fever and plague in Senegal," to Gorée, Thiès, Inouana, Rufisque, Tiaroye (gauche-protected dwellings) to "a focus of yellow fever" and elsewhere. At the Inaugural Session special honour was paid to the memory of Dr ADRIAN STOKER and Dr GUILLET sacrificed in the cause of Science. Tributes to the memory of Dr NOGUCHI and of Dr YOUNG are added in a supplement.

The first paper by Dr LAXTER on Yellow Fever in Senegal in 1927 opens with the statement that yellow fever had been "lying dormant in Senegal for nearly 14 years" but revived towards the end of 1926. The real value of this statement many possibly be understood by a somewhat similar one as regards Accra, which appears later (p. 123) viz., "Until the outbreak (1926-27) which forms the subject of this report Accra had remained free from any serious incidence of yellow fever for over fifteen years" (1911-1925). But a Table which immediately follows shows that another method of stating the facts is possible, viz., "That during the sixteen years (1911-25) Accra had never been free for a single year from yellow fever the number of reported cases having been 136, of which 83 had been fatal—these cases and deaths having been thus distributed—

	Cases	Deaths.
European	78	53
African	56	23
Syrian	2	2
	136	83

This is in accordance with the almost invariable experience of the British West African Colonies, viz., long periods of quiescence followed by a year or two of activity.

In Senegal in 1927 the reported cases were thus distributed by races

	<i>Cases</i>	<i>Deaths</i>
Europeans	133	88
Syrians	44	32
Portuguese halfbreed	9	8
Moroccans	4	1
	190	129

There were also 30 suspected cases with no deaths

Mention is made of the fact that 12 concealed cases with 11 deaths were nearly all Syrians whom their companions hid in order to escape sanitary measures. This justifies the present writer's call to 'Watch the Syrians'. Three pages in Dr LASNET's paper are devoted to symptomatology, two to the importance of early prophylactic diagnosis (suspected febrile cases), four to treatment and vaccinations, and six to epidemiology of the campaign and lessons learned from it.

A paper by A. Blair AITKEN, Andrew CONNAL, G. M. GRAY and E. G. SMITH deals with an outbreak of yellow fever in Lagos during 1923. It is stated that the previous epidemic at all approaching it in extent dates back to 1913. Twelve cases were officially reported with seven deaths and five recoveries. There were also five suspicious cases which ended in recovery.

Papers by A. Blair AITKEN and E. C. SMITH and Selwyn CLARKE deal with yellow fever in Lagos and Accra in 1923 and 1927.

A paper by Dr SOREL on Prophylaxis of Yellow Fever at Dakar rather suggests that until 1927 the Health service at Dakar had not been very efficient.

Dr SOREL's paper contains a valuable report (p. 265) on the use of sulphur dioxide in disinsection and deratization which embodies the experience gained in dealing at Dakar with 30,000 buildings including huts, houses, offices and shops, without previously sealing up cracks or covering native huts. Large apertures were either simply boarded up or plugged. In the native huts 30 grs per cubic metre of Sic du Midi were found sufficient to destroy mosquitoes, bugs, cockroaches and rats. The process is described as simple, rapid and as without noxious effect upon metals, fabrics, colours, glass and even foodstuffs, kola excepted.

The time occupied was thus much shortened: 70-75 huts or 30-40 rooms in concrete buildings being dealt with in a day by the medical officer in each district. The duration of exposure to the fumes was one hour.

When Dr Wyckliffe ROSE attended a meeting of the Colonial Advisory Medical and Sanitary Committee as a preliminary to the despatch of the Rockefeller Commission the writer strongly advised the selection of Dakar as the base of operations, his reading having led him to the opinion that it would prove to be the best place on the West Coast of Africa for the study of cases of yellow fever. This suggestion was however not adopted. On the same occasion he laid special stress upon the vast difference between eradicating yellow fever from such a place as Guayaquil and from any one of the West African Colonies.

So far as the writer has observed, this Report does not contain a single reference to the work of the Yellow Fever Commission (West Africa). Possibly the answer may be that the terms of reference to the Conferences precluded any review of the previous work.

None of the papers mentioned contains any important addition to our knowledge of the disease and as regards clinical analysis they are in less detail than the sections of the reports of the Yellow Fever Commission (West Africa) devoted to the subject.

Much space is devoted to the consideration of the work of Noguchi on *Leptospira icteroides*.

On his return from a Conference held in 1924 at Jamaica on Health Conditions in Tropical America the writer published a booklet entitled "An Impression of Jamaica and the Panama Canal Zone" in which he dealt with that work in the following terms (p. 18)

Dr Agramonte, one of the original band of four workers who in 1900 demonstrated that the *Stegomyia* mosquito, as it was then named, was the carrier of the virus of yellow fever and so settled for all time the problem of the mode of transmission of that disease, is of opinion that the only true scientific test of the validity of Dr Noguchi's claim is to inject into a human being the virus which has been discovered. This Noguchi has already done with animals, in which he states that he has reproduced the disease. Dr Agramonte definitely challenged Noguchi to do this in his speech at the Conference and offered to provide the necessary volunteers. I think that as Noguchi is on the staff of the Rockefeller Foundation he was justified in not accepting the challenge until the matter had been considered by the President. But the challenge must be accepted as until the point has been decided the value of the serum and vaccine now recommended for clinical use is in doubt, and further research on different lines is at a standstill and in this matter we cannot afford to wait. In the case of relapsing fever and trench fever a similar test was carried out in England with volunteers and no harm resulted. Dr Agramonte's men are ready and there should be no difficulty in arranging the conditions. No moral responsibility will rest upon the Rockefeller Trustees or on Dr Noguchi whatever may happen."

What has since happened appears to justify the suggestion as to the immediate necessity for a crucial test.

The extensive use of a serum based on a view of the disease not generally accepted, the attempt to introduce the term "West African Yellow Fever" needing as a preliminary a careful and prolonged study of the clinical aspect of the disease in America and West Africa and proof of the presence of features justifying such a differentiation in the nomenclature are serious departures from the true spirit of Science, which is based on accuracy and proof.

In the Final Report of the Yellow Fever Commission (West Africa) will be found a "Scheme for Further Research in Yellow Fever" drafted by Dr CORRIAL of the Research Institute, Lagos, and adopted by the Commission. This opens as follows.

Scheme for a Research on Yellow Fever

Attempted transmission of Yellow Fever to monkeys and other animals.

A. By direct inoculation with blood from a case of Yellow Fever

B. By indirect inoculation by infected *Stegomyia fasciata*.

From this it will be seen that had the work of the Commission been continued after the war its first object would have been to endeavour to discover a monkey susceptible to yellow fever. This may possibly have been the source of inspiration for the fruitful work of Dr Adrian STOKES and his colleagues. We should have begun with the Red Howler monkey if we could have obtained a supply as Dr ANDREW BALFOUR, then a Member of the Commission, had informed us of the tradition that in Trinidad there was always an unusual mortality amongst those animals before an epidemic of yellow fever. Whether we should have obtained a supply is very doubtful, as Dr HIGGINS has recently discovered. They are difficult to catch, very delicate and generally die on the voyage to this country.

In the view of the writer what is now required is not conferences or an elaborate system of liaison between the various Colonies on the West Coast, but that each within its own borders should apply all the methods known to be of service in the control, not "eradication" of Yellow Fever and that each one of them should keep its neighbours fully and accurately informed of the measure of success which has so far attended its efforts.

J. K. Fowler

LANE (Clayton) *The Mass Diagnosis of Hookworm Infection.*—*Amer J Hyg* 1928. Vol. 8. May Supplement. pp 1-148. With 15 figs. 11 charts & 2 diagrams in text. [91 refs.]

This publication represents co-ordination of a vast amount of data already reported upon over a number of years. Twelve years ago Clayton Lane brought under notice the importance of the principle of the control count. A knowledge of the ovum content of the faeces is essential before any inkling can be gained of the percentage of ova which a concentrative technique presents. Up to that time no such knowledge underlay the various techniques recommended. He compared various methods for counting eggs in faeces devised by himself and by others. These counts showed that every concentrative technique had its limit of effective concentration and if tried too highly failed in its delivery of eggs. Ignorance of this later discovered principle had tended to bring microscopical diagnosis into disrepute. The technique giving the highest average collection of eggs with the least variation proved to be Clayton Lane's D.C.F. procedure pushed to finality. The most erratic and least dependable of all methods in general use was the caustic soda counting method of Stoll. Its failure being due partly at least to the clumping of faecal material and the solvent action on the eggs. Where accuracy is essential, no alternative exists to D.C.F. pushed to finality. This technique consequently must be used to test the value of all concentrative techniques. Adverse criticism which has been made on this technique either traverses established physical laws or neglects that complete disintegration of faeces which is necessary before any concentrative technique can collect eggs apart from faeces proper. D.C.F. used diagnostically (i.e. examination of the cover after the first spin and after rapid lift) delivers on the average 80 per cent. of the contained ova in 1 cc. of a lightly or fairly lightly infected stool. This average is far higher and the variations from it far less than those displayed by any other diagnostic technique. Since the minimum ovum content normal for hook worms (that is the number of eggs oviposited by a single normal female) is not less than 33 eggs per gram, D.C.F. used diagnostically could display with certainty a single female hookworm normally ovipositing. This is not so with other techniques so that the statements of the percentage of infection in any country which do not make clear the diagnostic method employed are without scientific value. But a technique selected for mass diagnosis must be cheap as well as accurate and this can be best attained by bringing the stools to a central laboratory. Provided the temperature does not exceed 30 C. except for brief periods, stools brought under water to a central laboratory can be accurately estimated even when a month old and can be submitted to mass methods of disintegration, in centrifuging and in herding of eggs with the result that the majority of the eggs from 1 cc. of stool can be collected upon an area of 9 sq. mm. If eggs are present in conditions which imply normal oviposition they can always be detected in the herd. With a single twelve tube centrifuge, two sweepers and two microscopists can prepare and examine a quarter of a million specimens a year. The high diagnostic capacity of this method therefore makes practicable the humane and scientific treatment of populations in the mass and the elimination of that herd treatment which in Clayton Lane's opinion is ethically unsound.

R. T. Leiper

REPÚBLICA ARGENTINA. Segundo Congreso Nacional de Medicina, Buenos Aires (1 al 8 de octubre de 1922). *Actas y trabajos*. Tomo VI. *Bibliografía de Hidatidosis*. [Bibliography of Hydatid Disease.]—714 pp. 1927. Las Ciencias. Librería y Casa Editora de A. Guidi Buflarini, Junin 845—Buenos Aires.

This bibliography of the hydatids has been compiled by Señor Juan Tumaurus Librarian of the Faculty of Medicine at Buenos Aires. It

contains well over 7 000 references, even allowing for a certain duplication of entries arising from the classification adopted. The classification, which at first appears over-elaborate may prove useful to those wishing to study particular aspects of hydatid diseases. The compiler gives his references both chronologically arranged covering the period from 400 B.C. to A.D. 1925 (the references from the beginning of the 19th century being grouped by decades) and geographically arranged under countries. Other sections deal with age incidence, location of lesions, various methods of diagnosis, serum and other reactions, lines of treatment (drugs, surgery etc.) and with prophylaxis. The volume bears evidence of much work and, with so large a task to perform, it is not surprising if the result stops short of perfection. It seems regrettable that these independent efforts to compile comprehensive bibliographies of the world's literature on particular subjects are still necessary. There is an urgent need for the organization of such work territorially. If the uncoordinated energy now expended on bibliographical publications by scattered individuals and bodies were systematized, with national bureaux collecting the bibliographical data for their respective countries and classifying them on an agreed system, it would be relatively easy to assemble in one list the references on a particular subject so as to form a really authoritative and comprehensive bibliography.

R. L. S.

GREGG (A. L.) [M.A. M.D. M.Ch. B.A.O. (Dublin) D.T.M. & H. (Lond.) L.M. (Rotunda Hospital) Lecturer to Nurses at, and late Medical Superintendent of, the Hospital for Tropical Diseases, London.] *Tropical Nursing. A Handbook for Nurses and others going abroad.* With a Foreword by the Hon. Sir Arthur STANLEY G.B.E. C.B. M.V.O.—pp. xi+190. With 11 figs. 1929. London, Toronto Melbourne & Sydney. Cassell & Company Ltd. [6s.]

In the Preface this book is referred to as a newly born infant, the "accoucheurs" being Messrs Cassell & Co. Certainly it is "only a little one," but, on that account, more convenient to carry about in pocket or bag. We are also informed that the cover is insect proof, an excellent thing in regions where termites and cockroaches abound. The Introduction and first chapter deal with difficulties met with in a tropical environment and with personal hygiene necessary for the care of the nurse's health and for her personal comfort. Then follow sections on diseases generally found in the tropics. These sections are arranged in alphabetical order and they contain all that a nurse need know of tropical disease and perhaps more. We are surprised to find no mention of the enteric fevers and to one section the reviewer distinctly objects. It is headed "Climatic Babo" and the author states that "The condition is of venereal origin, but the infecting organism has not definitely been identified." Buboes, in the groin or elsewhere, may arise from causes other than syphilis or plague but they are not caused by climate. Throughout the medical sections instructions, more or less sufficient, are given as to nursing and diet, but much is missing which a nurse ought to know but which she will have picked up if she has done practical work in a hospital before going out to tropical countries. Bedsores are referred to once, but the nurse is not told how best to prevent them or how to treat them. The use of the bedpan and of the thermometer do not appear in the index, nor is there any reference to important variations in respiration, nor again to the protection of and from sputum as in tuberculosis, which is very prevalent in tropical and sub-tropical regions. A short chapter on technique and a most useful one on "Care of the Eyes" completes the book. There is also a glossary of medical terms and an index.

J. H. Tull Walsh.

TROPICAL DISEASES
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[No. 8]

LEPROSY

HOPKINS (Ralph) & DENNEY (Oswald E.) *Leprosy in the United States. A Statistical Study of Seven Hundred Cases in the National Leprosarium.*—*Jl Amer Med Assoc* 1929 Jan. 19 Vol. 92. No. 3 pp. 191-197 With 9 charts in text. [6 refs.] Also in *Public Health Rep* 1929 Mar. 29 Vol. 44 No. 13 pp. 695-710 With 9 charts in text. [8 refs.]

This paper gives a valuable analysis of 700 cases of leprosy in the Carville U.S. National Leprosarium formerly the Louisiana Leper Home, during the 34 years of its existence. Of these 215 were foreign born, mostly from Mexico China, the Philippines Italy Greece and Germany. The very great majority of the home cases came from Louisiana and other southern Gulf States. The present known number of lepers in the United States is 718 against only 242 in HOFFMANN's table of 1920 due to more careful recent search. Of 423 Louisiana lepers only 86 were negroes 337 were whites or more than twice as many in the whites in proportion to the population, the explanation of which is not obvious. [The early history showed that the disease was first introduced among French families among whom it spread widely.] The types are classified as 11 per cent. nerve 39 skin and 50 mixed. 72.3 per cent. were males and only 27.7 females as is usual with leprosy probably due to greater exposure of roaming males to infection. All occupations and social scales are affected the average age on discovery of the infection was 30 years and on admission 36 years leaving an average of 6 years of freedom to infect others, as is always the case under compulsory segregation. Some interesting examples of family infection are given these were often not in chronological order indicating infection and not heredity. Among 70 cases in 13 families plotted out prolonged exposure for six to ten years or more is shown before infection occurred. Five cases of probably 5 to 7 years incubation are recorded. The incidence of initial lesions mostly on the face and the extremities is in accordance with experience in India. The age of onset is considered in relation to the corresponding ages of a normal population, and the data confirm the comparative rarity under 9 years due largely to long incubation period, and a large proportion of cases between 9 and 30 with the

maximum at about the age of puberty this is also in accordance with general experience. The mortality has shown a great decline in recent years and as elsewhere only 18 per cent. died directly of leprosy and the majority of lung, renal and septic diseases. During the last 14 years 48 patients were paroled and 20.9 per cent. relapsed, but recently with 18 negative monthly bacteriological examinations before release only 1 of 28 or 3.6 per cent. has relapsed.

L. Rogers.

DENNEY (O. E.) The National Leper Home (United States Marine Hospital) Curville, La. Review of the More Important Activities during the Fiscal Year ended June 30 1928.—*Public Health Rep* 1929 Mar 8. Vol 44 No 10 pp 528-534 [1 ref.]

This report deals with the year ending June 30th 1928 that of the previous year was dealt with in this *Bulletin* Vol. 25 p. 637. It opens thus: "The optimism previously noted among the patients continued during the year. Decreased suffering and mortality and increasing numbers of the paroled were the cause of the optimism, for 11 or 4 per cent. were released with leprosy arrested and only one was readmitted for further treatment. Chaulmoogra oil rendered un-irritating by the addition of benzocaine was mainly used both orally and by intramuscular injection with very satisfactory results. Proteins have also been injected and one case on hirudin showed great clinical improvement. The neuropsychiatric surgical and orthopaedic service have been continued and attention has been paid to occupational therapy. Lepers are allowed to pay short visits to their homes under certain restrictions, and everything possible is done to ameliorate the lot of the leper in this model and liberally financed institution."

L. R.

GUSHUE TAYLOR (G.) Leprosy in Formosa.—*China Med J* 1929 Jan Vol 43 No 1 pp 6-12 With 2 figs. on 1 plate.

Three years hospital out-patient work showed 280 leper patients, and the total on the island is estimated at not less than 4,000. The disease began mostly between 11 and 40 years with the largest number from 11 to 20. The majority of the patients attended fairly regularly for treatment and *Hydnocarpus waghiana* oil with 4 per cent. creosote (Hydnocreol of Smith Stanistreet & Co. Calcutta) and alepol have been adopted in place of ethyl esters on account of the far higher cost of the latter with the result that 70 per cent. have improved, but only a few have as yet fully recovered in the short time available. Sodium bicarbonate in 15 to 30 grain doses was found best for checking undesirable reactions. At least three leper colonies for the isolation and treatment of infective cases are advocated, while nerve and quiescent early cases should be treated at public hospitals but many decades of work will be necessary for the full success of the campaign.

L. R.

VIGNE (Paul) La lèpre à Marseille. [Leprosy at Marseilles.]—*Bull Acad. Méd.* 1929 Mar 27 Year 93. 3rd Ser Vol. 101 No 12 pp. 438-441

The author has seen 26 cases and estimates 40 in Marseilles most from French Colonies and abroad. Two autogenous cases are reported in girls who accompanied their fathers to endemic areas in the tropics and he thinks further powers are needed to check the increase together with special treatment centres in the large ports.

L. R.

- i. WRIGHT (F. C.) Leper Colony at Riga.—*Jl Roy Nav Med Ser* 1929 Apr Vol 15 No 2 pp 124-129 With 5 text figs.
- ii. PUBLIC HEALTH REPORTS. 1929 Feb 22 Vol 44 No. 8. pp 405-406 Census of Lepers in Mexico
- iii. SALZBERGER (M.) Die Lepra der oberen Luftwege und des Ohres in Palästina und Cypern. [Leprosy of the Upper Respiratory Tract and Ear in Palestine and Cyprus.]—*Monatsschr f Ohrenheilk u Laryngo-Rhinol* 1928. Vol. 62. No 10 44 pp. With 10 text figs & 3 coloured plates. [19 refs]
- iv. KNIAJINSKY (B.) [La lèpre dans l'Ouzbékistan] [Leprosy in Uzbekistan.]—*Hygiène et Épidémiologie* Moscow 1928 No 9 [Summarized in *Bull Office Internat. d'Hyg Publique* 1929 Jan. Vol 21 No 1 pp 186-187]
- v. MÉTÉLKINE (A.) [Pes-khona (le village des lépreux à Boukhara)] [Leper Village in Bukhara.]—*Ibid* [Summarized in *Bull Office Internat. d'Hyg Publique* 1929 Jan. Vol 21 No. 1 pp 137-138]
- vi. ARAUJO (H. C. de Souza) Das Lepraproblem in Brasilien. [Leprosy Problem in Brazil.]—*Seuchenbekämpfung* Vienna. 1929 Vol. 6. No 1 pp 25-30 [Oswaldo Cruz Inst. Rio de Janeiro]

i. During a visit to Riga the author was shown the leper institution with 127 inmates a second holds 90 About 5 per cent recover largely owing to natural causes after a number of years.

ii. A first census of leprosy in Mexico resulted in returns from only 435 of the 2,272 municipalities and 1,450 cases were registered half being nodular ones. The provincial distribution and age incidence is given. Of 652 histories 359 acquired the disease by contact and the majority of known cases live in crowded filthy conditions.

iii. In Cyprus there are 80 cases at the Leper Institute near Nicosia and a few more in the town. In Jerusalem there are 30 cases 17 nodular 8 mixed and 2 nerve forms. A detailed clinical description of cases with good illustrations follows.

iv. Isolated cases not exceeding 100-150 are present in the Republic of Uzbekistan in Central Asia and there is a leprosarium at Tashkent and village isolation elsewhere but the inmates are allowed to go out begging. Cases of vitiligo are often confused with true nerve leprosy.

v. In Bukhara leprosy is believed to be highly contagious and isolation is demanded in special leper villages and quarters of towns. The number of lepers is not apparently known.

vi. Dr de Souza Araujo gives a further account of leprosy in Brazil. A table shows an estimate in July 1927 of a total of 11,894 cases against an approximate estimate in 1924 of 24 000. The largest numbers are found in S. Paulo with 4 620 and in Para with 2,540 but no other state has as many as 1 000. A list of the leprosaria and hospitals for lepers is given.

L. R.

DA MATTA (Alfredo) O censo da lepra no Amazonas e sua revisão (1922 a 1928) [Leprosy Census in the Amazonas, 1922-1928].—*Brasil Medico* 1929 Mar 2 Vol 43 No 9 pp. 226-228. Also in *Scientia Med.* 1929 Mar Vol 7 No 3 pp. 106-114.

This is an enumeration of the cases of leprosy recorded from 1922-28 inclusive in the District of Amazonas together with the distribution according to age, sex, and calling. The figures as given amount to 1 001 but by faulty addition is called 971 and the subsequent information is based on the latter. 70.7 per cent. were of the anaesthetic form, 15.2 per cent. nodular and 14.1 per cent. mixed. The number of males was rather more than twice that of the females.

H. Harold Scott.

PUEENTE (José J.) El problema de la lepra en la República Argentina. [Leprosy in the Argentina].—*Semana Med.* 1929 Mar 28 Vol 86 No 13 (1837) pp. 756-761.

The census of the National Department of Hygiene gives the number of lepers as 1 560 but probably the total is in the neighbourhood of 5 000-6 000 or 0.5 per mille. Every Province has some lepers, the central more than the rural. Most are of the labouring classes.

H. Harold Scott.

WORLD'S HEALTH 1929 Jan.-Mar Vol 10 No 1 pp. 59-71.
Leprosy To-Day Leprosy in Japan [TAKANO (Rokuo) pp. 59-67].
The Work for Lepers in Siam [VALLABHAKARA (Prince) pp. 68-70].
The Campaign against Leprosy in Colombia [BEJARANO (Jorge) p. 71].

Dr Takano's article on leprosy in Japan gives interesting data indicating a decrease of the disease in recent years. An investigation in 1923 showed a total of 15,351 cases over two-thirds being males and with the usual age distribution, and a table of the detailed distribution is given, the general rate being 0.257 per mille. A prophylactic law was passed in 1907 since which the leprosy deaths as compared with those from other causes has fallen by about 60 per cent., and the number of lepers found in the annual examination of recruits has been reduced from 483 to 215. There are five sanatoria for leprosy in Japan to hold 1,530 but the accommodation is to be increased to 4,500 by 1930 and half the cost of the buildings and one third of the upkeep is being provided by Government. Private sanatoria can hold 507 more patients mostly under missionary bodies. Under favourable housing conditions and superintendence lepers can be treated at home as in Norway. Moreover an area near the Kusatsu thermal establishment, in the healing powers of which lepers have confidence is to be reserved as a settlement for lepers with proper

treatment. A scientific association against leprosy has been organized in the work of which the Japanese Mission to Lepers is collaborating. The outlook is becoming increasingly hopeful.

In Siam with a population of 10 000 000 the lepers are estimated at not less than 20 000 presenting a difficult problem. Twenty years ago Dr J W McKEAN first organized a leper settlement on jungle land of the Government at Chiangmai in north Siam which now has 300 inmates. In 1922 the Siamese Red Cross Society established a clinic in the capital Bangkok to provide the new effective treatment free for early cases and last year over 1 000 lepers attended with great benefit to 83 per cent. and improvement in 29 per cent more locally manufactured ethyl esters were used. In 1923 a Red Cross leper asylum was also established near the city for the voluntary isolation of advanced infective cases with 180 inmates soon to be raised to 400 with treatment family life and a school for children. A good start has thus been made although the main problem is still untouched.

The Republic of Colombia is also tackling the leper problem vigorously and maintains three institutions the largest has received 3 522 patients and the other two hold 3 517 or a total of 7 039 in a population of 7 000 000

L. R.

LIE (H. P.) Why is Leprosy decreasing in Norway?—*Trans Roy Soc Trop Med & Hyg* 1929 Jan. 30 Vol. 22. No. 4 pp 357-366. With 2 figs. [2 refs.]

This is a most interesting account of the success of the humane Norway system of isolation with as little compulsion as possible in reducing the number of lepers from 2 858 in 1856 to about 90 at present or from 2 to 0.03 per mille in about seventy years. The ancient history of the disease in Norway is first given it has been present for 1 000 years no new case has been seen for the last two years, and few but old uninfected nerve cases now remain while the number of new cases in the five year period up to 1925 was 15 against 1 040 in the five years to 1865. He rightly lays stress on the fact that the most infectious cases were chiefly isolated, while home isolation where good sanitary conditions made it safe was permitted. He gives data to show the danger of close association in houses with lepers especially in producing infection of the highly susceptible children and this was greatly diminished by isolation but he also gives due weight to the value of improved economic conditions hygiene and sanitation in favouring the decline of the disease but concludes that as an important factor in this respect isolation conceived and applied as I have shown above has played a considerable role. This paper furnishes very striking evidence in favour of that conclusion.

L. R.

TISSEUIL. Les léproseries partielles en Nouvelle-Calédonie. [*Leprosy Villages in New Caledonia.*]—*Bull Soc Path. Exot* 1929 Feb 13 Vol. 22. No. 2 pp 95-114 With 3 text figs. & 1 folding map. [7 refs.]

In this paper the author returns to the subject [*ante* p 334] and records at length once more the history of the varying efforts at pro-

phylaxis against leprosy in the island of New Caledonia. At present there are 58 leper villages mostly with less than ten lepers and with little or no supervision or treatment except where missionaries are available. In the Loyalty Islands the leper villages are rather larger and in Lifou one under missionaries had 182 patients. Financial difficulties have prevented improvement of the system, which is very inefficient.

L. R.

Metc (E.) *The Campaign against Leprosy.*—*Indian Med Gaz.* 1929. Feb. Vol. 64. No. 2. pp 82-85.

In India since 1925 the Indian Council of the British Empire Leprosy Relief Association has worked to replace the old method of forcible segregation by voluntary clinics under doctors trained in the modern treatment, which allows the majority of early cases to be cleared up and kept free from active signs and infection of leprosy and now patients are coming forward early instead of hiding their disease. Propaganda in the villages is teaching how to prevent contagion and surveys are being carried out, with resulting opening of new clinics and breaking down of the old belief that the disease is irremediable. A leprosy film illustrating the modes of infection and treatment is drawing large crowds to the cinemas and has a good educative effect.

L. R.

Ukena, Jr (Paul) *Die Bekämpfung der Lepra.* (The Control of Leprosy) —*Dermat Woch* 1928. Dec. 15. Vol. 87. No. 50. pp 1921-1928.

The author traces the development of public opinion regarding the transmissibility of leprosy from the middle ages when lepers were outcasts from society through the First Leprosy Conference Berlin, 1897 when compulsory isolation was still demanded and the Second Leprosy Conference Bergen, where there was a tendency to milder measures, to the Third Conference at Strasburg, in 1923 when it was recommended that measures should be suited to different countries. Since then many writers with whom the author agrees, have endeavoured to show the fatality of compulsory isolation, which has the effect of causing patients to conceal their disease and thus become a danger to their neighbours just at the period when they are most infectious and most easily cured. Treatment, not isolation, is necessary. Two cases are quoted to show how easily even advanced cases escape recognition in Europe where few doctors are familiar with the disease. Compulsory isolation is a relic of mediaeval barbarism that must be superseded by early recognition and early treatment. Only in the case of homeless persons such as beggars and tramps should lepers be treated in special institutions, otherwise in their own homes or as out patients at polyclinics, where all incipient cases should be registered. The particular method of treatment adopted is of less importance than that it should be carried out as early as possible.

L. R.

LEPROSY NOTES. 1929 Apr No. 5 36 pp Issued Quarterly
by the British Empire Leprosy Relief Association.

This number gives information regarding the incidence of leprosy in Europe and in the Dutch East Indies on work in Ceylon and in Madras. It includes articles by Dr J LOWE on early diagnosis and on the potassium iodide treatment which he finds to have very few if any advantages and many disadvantages as compared with chaulmoogra and hydnocarpus oil derivatives. Dr R. G COCHRANE (now Secretary to the British Empire Leprosy Relief Association) reports favourably on the use of alepol, and he has been able to give as much as 10 cc. of a 6 per cent solution intramuscularly twice a week without pain. The facilities for the study of leprosy in Great Britain are dealt with by Dr Andrew BALFOUR, who draws attention to the fine illustration of the disease at the Wellcome Museum of Medical Science.

L. R.

MOTTA (Joaquim) Cancro leproso [The "Primary Sore" of Leprosy]—*Folha Med* 1929 Mar 15 Vol. 10 No 8 pp 87-88

The so-called leprous chancre is not a new idea. BAJON is said to have spoken of it more than 150 years ago. On an analogy with syphilis the generalized rash would indicate some primary site of infection. The author guardedly does not undertake to support the theory but relates a case in which there was an isolated ocular lesion and records it as a typical instance. Sections of a portion removed showed no acid fast bacilli, but as ROGERS and MUIR have noted, many of the primary infections which we have found in the skin have failed to show any bacilli.

H. Harold Scott

LOWE (John) Nerve Abscess in Leprosy—*Indian Med Gaz* 1929 Jan. Vol. 64 No 1 pp. 24-25 [1 ref.] [Leper Hosp. Dichpali, Nizam's Govt. State Ry]

In about 1 000 cases of leprosy nerve abscesses have been met with in 19 always in the arm and in 14 of the cases in the ulnar nerve, usually three or four inches above the elbow. The nerve is commonly involved for two or more inches and adherent to surrounding structures while the contents of the abscess are cheesy. Increased pain in the nerve and anaesthesia in its distribution result and are relieved by operation. Abscess may follow a reaction and is more frequent under iodide treatment. The sheath of the nerve should be incised and the abscess lightly scraped out, the nerve trunk should be freed from adhesions but drainage is unnecessary while both pain and contraction of the fingers may be prevented by this treatment. He agrees with MUIR that ephedrin prevents or minimizes nerve lesions during treatment.

L. R.

FRANCHINI (Giuseppe) Setticernia da bacilli di Hansen in un caso di lebbra nodulare [Bacillæmia in a Case of Nodular Leprosy]—*Arch Ital Sci Med Colon* 1928, Nov Vol 9 No. 11, pp 643-646. With 2 figs. on 1 plate. [Inst. of Trop Path. Univ Bologna.]

Blood taken from a vein in this patient, a man of 45 years, from Brazil, was stained by the Ziehl-Neelsen method and Hansen's bacilli were found, some free others within leucocytes especially the large mononuclears. There was no rise of temperature at the time the specimen was taken.

H. Harold Scott.

GREEN (Richard) Some Observations on the Leprous Reaction. (Synonyms—Leprotic Fever the Acute Exanthem of Leprosy Lepra Reaction, etc.)—*Trans Roy Soc Trop Med & Hyg* 1929 Jan 30 Vol. 22 No. 4, pp 367-380 With 21 figs. on 6 plates & 2 charts. [22 refs.] [Inst. for Med. Research, Kuala Lumpur F.M.S.]

This is an interesting discussion of the vexed question of leprosy reactions. The following are the author's summary and conclusions—

1 The leprosy reaction has been discussed in its various aspects which include the frequency of occurrence associated cutaneous and nerve lesions, predisposing factors, duration, benefit or otherwise to the patient, theories concerning causation, and treatment.

"2. Brief observations on patients at the Kuala Lumpur Settlement are recorded from these points of view

3 A wider recognition of the condition as a distinct phase of leprosy is suggested among those concerned with lepers and among dermatologists, particularly in the tropics. More frequent records from workers in leprosy should assist in bringing this about.

"4 Factors which predispose to the reaction in each class of patient should be investigated and kept in mind during treatment.

5 In using treatment which may induce reaction, distinction should as far as possible be drawn between the stages of leprosy reached by patients with a view to anticipation and avoidance of reactions at undesirable stages the beneficial effect of the reaction being apparently confined to lepers in MUIR's third stage

6 The leprosy reaction appears to have its origin as an acquired condition of allergy towards *M. lepræ* already in the tissues. This condition, combined with the possible multiplication and dissemination of the *M. lepræ* at this period, may account for the appearance of all the subsequent manifestations of the reaction.

"7 Treatment of the leprosy reaction, from the point of view of desensitization with adrenalin or epinephrine, appears to be effective in the majority of cases

L. R.

JEANBELVE (E.) GIRAUDAU (R.) & BUREAU (Yves) De l'exploration de la fonction sudorale au niveau des manifestations tégumentaires de la lèpre par la méthode de l'ionisation de pilocarpine [Sudoral Function in Skin Manifestations of Leprosy]—*Bull Soc Française Dermat et Syph* 1929 Mar No 3, pp 139-148 [3 refs.]

The authors have used the method of ionization with pilocarpine in a cream to test the alterations in the sweating power of the skin

in leprosy. They describe six trials which showed that the loss of the power of sweating of affected areas of the skin might be partial or complete. Microscopical examinations also demonstrated greater or less degrees of atrophy of the sweat glands in the affected skin.

L. R.

DAVISON (A. R.) **A Note on Leprous Lesions of the Scalp**—*Lancet*. 1929 Apr 6 p 717 With 1 text fig

The author reports that contrary to the experience of MUIR in India, he has found lesions of leprosy to be frequent on the scalp of African patients in the Emjanayana Leper Institute of South Africa, and he illustrates macular and nodular lesions in this position. He suggests that the African natives are predisposed by lack of cleanliness and the frequency of scalp injuries in stick fights affording opportunities for the entrance of the lepra bacilli.

L. R.

CROZIER (G. G.) & COCHRANE (Robert G.) **Leprosy in an Infant**. [Memoranda.]—*Brit Med J* 1929 Mar 16. pp 501-502.

A female child was born to leper parents who were under treatment in Assam on December 25th 1924 with an ulcer on the right heel which recovered in two weeks under hydnocarpus oil locally. The child and her parent left apparently cured in May 1925 but returned in seven months with a typical discoloured leprous patch on the scapular region of the child, which disappeared in two months under hydnocarpus oil injections and the child remained well up to June 1928. The mother was not infectious but the father was at the time of the birth of the child and no lepra bacilli were found in the child's heel ulcer so it is doubtful whether the disease was congenital or acquired.

L. R.

WADE (H. W.) **Leprosy**—*Milit Surgeon*. 1929 Jan. Vol. 64 No 1 pp 81-90

This address by a high authority before a Medical Conference at Manila gives a brief general account of the etiology and pathology of the disease.

L. R.

ROBINEAU **Considérations sur le mode de contagion de la lèpre**. [Mode of Contagion of Leprosy]—*Ann. de Méd. et de Pharm Colon* 1928. July-Aug-Sept. Vol. 26. No 3 pp. 305-322. [15 refs.]

This paper reviews the evidence on contagion and concludes that the healthy are infected by repeated inoculations directly or indirectly from neighbouring lepers who may be apparently healthy. No insect is the intermediate host, but domestic insects may play a mechanical role and some solution in the continuity of the skin or mucous membrane affords access to the lepra bacilli, the transit of which should be prevented.

L. R.

RANGEL (Mario). Aspectos diversos do problema da lepra. Tentativas de cultura do bacillo de Hansen.—A lepra transmittida pelos insectos? O Eparseño no tratamento da lepra. [Aspects of the Leprosy Problem.]—*Rev Med. Cirurg do Brasil* 1928. Nov. Vol. 36. No. 11 pp 463-469

The author mentions the well-known attempts at cultivation of the bacillus and he himself tried by inoculating leproma emulsion into Ringer Locke serum but with negative results. As regards insect transmission, examination of *Culex pipiens* caught in the leper hospital failed to reveal any acid-fast bacilli, but between 40 and 50 per cent. of bugs and flies [not further identified in the paper] caught in the beds or near the patients had acid fast bacilli in their intestines. He records two cases treated with eparseño injections, starting with 0.5 cc dose—one had 14 cc. in three months and then died, the other had 25 cc in the same period. Neither patient showed the least improvement or even arrest of the disease.

H. Harold Scott.

DE LANGEN (C. D.). Specifieke huidreacties bij Lepra.—*Geneesk. Tijdschr v Nederl Indië* 1929 Feb. 20. Vol. 69 No. 2 pp. 156-164

— Specific Skin Reactions in Cases of Leprosy.—*Meded. Dienst d Volksgezondheid in Nederl Indië* 1929 Vol. 18. No. 1 pp. 113-119

Repeating the experiments of BARGEHR (see this *Bulletin*, Vol. 24, p. 216) but using sterilized and pulverized leproma substance, the author was able to confirm BARGEHR's conclusions. In some healthy individuals he also succeeded by repeated and extensive inoculations in turning the negative reaction into a positive one. The reaction is very probably specific and therefore it may become of practical importance.

1 It may be an aid in the diagnosis of early cases and

2 In distinguishing between active cases with a negative and old inactive healed cases with a positive reaction to lepromin the old inactive cases have probably no further epidemiologic significance.

3 A positive reaction in a person who has frequently been in contact with lepers justifies the opinion that he has acquired sufficient resistance against the infection.

4 Possibly the test may become of some prophylactic significance.

Therapeutic experiments with lepromin so far have only yielded negative results.

W. J. Bais.

DE VOGEL (W.). Réaction de Pirquet provoquée par la substance stérilisée des lépromes. Expériences faites par le Dr BARGEHR, ancien Directeur de la léproserie de Pelantoengan (Ile de Java). [Pirquet's Reaction in Leprosy].—*Bull. Office Internat. d'Hyg. Publique* 1929 Jan. Vol. 21 No. 1 pp 101-105

This paper summarizes the already published results obtained by BARGEHR in the Dutch East Indies by the intradermal injection of lepromin made from leproma nodule with positive results in apparently healthy persons living with lepers and in recovered or burnt out nerve cases but negative ones in persons never in contact with lepers (see this *Bulletin* Vol. 24, pp 559 and 910 Vol. 25 p 203)

L. R.

- i. PELTIER (M) De la valeur technique de la méthode de Rubino dans la recherche de la sédimentation globulaire chez les lépreux. [Value of Rubino's Method of Sedimentation in Leprosy]—*Bull Soc Path Exot* 1928. Dec. 12. Vol 21 No 10 pp 838-838.
- ii. MARKIANOS (J) Réaction de sédimentation des globules de mouton formolés dans la lèpre.—*Ibid* 1929 Mar 13 Vol. 22 No 3 pp. 152-155 [7 refs.]

i. RUBINO's original red corpuscle sedimentation test and the modification of MARCHOUX and CARO in which the reaction is made more sensitive by increasing the proportion of leprosy serum have been tried with 22.2 per cent. of positive reactions with the former and 33.3 per cent. with the latter with leprosy serum but Marchoux and Caro's method gave 17.3 per cent. of positive non specific reactions with non-leprosy serums against none by Rubino's plan.

ii. Markianos as the result of his tests found the reactions negative except in the case of leprosy and he prefers Marchoux and Caro's technique as the more sensitive.

L. R.

- HENDERSON (John M) DE (N K) & GHOSH (S) Notes on some Haematological and Serological Investigations in Leprosy—*Indian J Med Res* 1929 Jan. Vol 16. No 3 pp. 687-694 [30 refs.] [School of Trop Med. & Hyg Calcutta.]

Observations are recorded on the specific gravity of the blood, estimated by glycerine and water solutions the fragility of the red corpuscles and the surface tension of the serum in leprosy cases. It was found that in cases showing increased rate of sedimentation of the erythrocytes there was also a tendency to a fall in the specific gravity of the blood and in the surface tension of the serum irrespective of the type or stage of the disease.

L. R.

- i. GOMES (J M) & DO PATEO Jr (J Duarte) Desvio do complemento na lepra. [Complement Deviation in Leprosy]—*Rev Biol e Hyg* S. Paulo 1928. Vol. 1 No 3 pp 89-102. English summary pp 102-104 [13 refs.] [Hyg Inst. S Paulo]
- ii. TAMURA (Teiryō) Studies on Thermal Influence upon Wassermann Reaction. Especially on the Diagnostic Account of the Freezing-Point Method in Non-Specific Wassermann Reaction with Leprosy Serum.—*Scientific Reports Govt Inst Infect Dis* Tokyo 1927 Vol. 6. pp 165-179 With 2 figs. [27 refs.]

i. This worker concludes that complement deviation in leprosy with defatted *Streptothrix leproides* of Deycke is of diagnostic value and also in treatment and prognosis. It is also of value in early cases and its strength indicates the seriousness of the disease.

ii. The author reports that on modifying the Wassermann test by treating the serum primarily at the freezing point negative reactions are obtained with non-syphilitic leprosy sera, but positive ones in syphilis.

L. R.

SALMISTEN (Yrjö W.) Ueber die Wassermannsche Reaktion im Serum Lepröser und ueber Liquoruntersuchungen bei Lepra. [The Wassermann Reaction in the Serum and C.S.F. in Leprosy]—*Acta Soc. Med. Fennicae Duodecim* Helsingfors. 1928. Vol. 10. Fasc. 1/2. No. 2. 84 pp. [109 refs.] [Dermat. Clinic, Helsingfors Finland.]

This detailed paper with a number of references and experiments arrives at the following conclusions. The cerebro-spinal fluid in leprosy shows not very considerable changes probably of short duration, in the form of an increase in the cellular content and in the albumin present. The Wassermann test with the fluid is always negative. The changes noted are probably related to pathological lesions of the central nervous system since the author found them chiefly in nerve forms of leprosy and in maculo-anaesthetic types rather than in nodular cases. Examination of the cerebro-spinal fluid in leprosy is not of very great significance except in the diagnosis of nerve forms of leprosy from syringomyelia, for in the latter disease the cerebro-spinal fluid is normal so temporary pathological changes in this fluid suggest leprosy.

L. R.

SCHIRWINDY (S. L.) Zur Frage der serologischen Reaktion bei der Lepra. [The Serological Reaction in Leprosy]—*Ztschr. f. Immunologie u. Experim. Therap.* 1928. Vol. 59. No. 5-6. pp. 461-478. 8 refs. [Central Serolog. Lab. Leningrad.]

Summary

1 In spite of the statements of most authors and of our own data obtained in 1922 and 1928 regarding the high percentage of non-specific positive results of the Wassermann Reaction in leprosy we consider a further trial necessary for the results obtained by us in 1927 with the employment of fresh leprosy sera gave a relatively small percentage of positive reactions (6.4 per cent.) at the same time it is often difficult to exclude the simultaneous existence of latent syphilis.

2 Leprosy sera possess marked complementary properties in the rare cases where the haemolysis occurs rapidly in the controls with the usual method for the Wassermann reaction (dilution of the serum to 1:5) and a positive result is obtained, the possibility of some other simultaneous infectious disease (latent syphilis) must be considered.

The modifications of the Wassermann reaction according to BOAS (titration of the sera) or still better according to KATZ are most appropriate for leprosy sera the method which is given in the All-Russian Instruction for the method of the W.R., is difficult to apply for this purpose.

3 If regard be had to the rapidity with which leprosy sera develop complementary properties even when kept for only a short time (according to FINKELSON) and these sera be subjected to the W.R. and to the other serological investigations which are employed in syphilis as soon as possible after the withdrawal of the blood (best in the first 12 hours afterwards) then completely specific results of these reactions will be obtained and in pure forms of leprosy negative results will follow.

4 Since the process of inactivation probably accelerates the formation of anticomplementary properties in leprosy sera, the employment of the active modification of the W.R. is to be specially considered in leprosy.

5 In examining leprosy sera one should not limit oneself to the W.R. or any one of the other reactions, but the sera must be tested with all the reactions that have been proved in the serology of syphilis the

occurrence of a positive result in all these reactions is a rare phenomenon and the percentage of such positive results according to our material is 3.2, in which in a certain number of cases one may assume the simultaneous existence of latent syphilis

6 Bruck's active method, which gave only 6.3 per cent. of positive results and extremely interesting data in regard to the haemolytic properties of leprosy sera in an active state deserves attention and further investigation.

7 The Sachs-Georgi reaction, which in our material gave 10.7 per cent. positive results in 1926 and 20 per cent. in 1927 as well as the Hahn reaction, which is similar in nature to the first named and showed 12.5 per cent. positive results can with difficulty be employed for the examination of leprosy sera we are unable to confirm the findings of ROSENTHAL and PRICHODTSCHENKO on the Sachs-Georgi reaction

8 Of Meinicke's reactions one should in the first place try the third modification (D.M.) which gave an almost equally small percentage of positive results in 1926 (5.5 per cent.) and 1927 (5.4 per cent.) Meinicke's turbidity reaction (M.T.R.) gave in 1926 10.7 per cent. positive results, it was not tried in 1927 the microreaction (M.M.R.) gave in 1926 17.8 per cent. of positive results which were considerably more favourable in 1927 when only 6.4 per cent. positive results were obtained the last-named reaction has a special advantage in that only a minimal quantity of blood serum is necessary for the examination (2 to 3 drops)

9 For the differential diagnosis between leprosy and syphilis by means of serological examinations the first place must be given to the Wassermann reaction of the complement fixation method and the active method of BRUCK out of the whole series of precipitation, turbidity and flocculation reactions Meinicke's reaction in its third modification (D.M.) and his microreaction (M.M.R.)

L. R.

HOFFMANN (W. H.) Ueber latente Immunisierungsvorgänge bei der Lepra. [*Latent Immunisation Processes in Leprosy*].—*Ztschr f Immunitäts u Experim Therap* 1929 Vol. 59 No 3/4 pp 297-305 [Finlay Inst Health Ministry Havana, Cuba]

In leprosy there is an infection which runs its course without any symptom and a latent immunity is produced thereby

These latently infected and thereby more or less immunized cases probably play a large part in the epidemic distribution of leprosy since they are difficult to recognize

With improved serological methods these cases will probably be discovered to a great extent in careful examinations of the contacts of known cases and can thus be brought under early treatment

This may be regarded in the future as one of the most important aids in the campaign against leprosy In conjunction with the present-day means of treatment it offers prospects of an effective stamping out of leprosy as an endemic disease.

L. R.

MACHT (David I.) Phytopharmacological and Photopharmacological Studies on Leprosy Blood Serum.—*Jl Philippine Islands Med Assoc* 1928 Dec. Vol. 8 No 12. pp 523-524 [8 refs]

The author applies these terms to the study of the effects of various drugs and toxins on living plant protoplasm by this means he found

SALMINEN (1738 W.) Leber die Wassermannsche Reaktion im Serum Lepröser und ueber Liquoruntersuchungen bei Lepra. [The Wassermann Reaction in the Serum and C.S.F. in Leprosy]—Acta Soc. Med. Fennicae "Duodecim." Helsingfors. 1928. Vol. 10. Fasc. 1/2. No. 2. 84 pp. [109 refs.] [Dermat. Clinic, Helsingfors, Finland.]

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L. R.

SCHROVINDT (S. L.) Zur Frage der serologischen Reaktion bei der Lepra. [The Serological Reaction in Leprosy]—Ztschr. f. Immunitäts- u. Experim. Therap. 1928. Vol. 59. No. 5-6. pp. 461-478. 8 refs. [Central Serolog. Lab. Leningrad.]

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both, growth first appearing after fifteen days. On staining, the sputum showed a mixture of acid fast and non-acid fast filaments and subcultures were obtained on agar broth and potato with 5 per cent glycerine. Subsequent cultures gave only the characteristic elements of an actinomycosis. He further states that he has already obtained the same results from four patients, so his work confirms that of previous observers including KEDROWSKY who also thinks the leprosy fungus belongs to the Actinomyces group. The fungus produces radiating furrows with pigmentation is gram positive, non-acid fast and shows the morphology of the first type of actinomyces with rudimentary thallus. He states in conclusion that he does not yet know the relationship of his organism to leprosy.

L. R.

FRIEDHEIM (Ernst A. H.) L'origine de la cellule lépreuse étudiée en culture de tissu. [The Origin of the Leprosy Cell studied in Cultures].—*C R Soc Biol* 1929 Jan 25 Vol. 100 No 3 pp 163-165 [Pasteur Inst. Paris]

This paper deals with attempts at tissue culture of rat leprosy material, in which the polymorphonuclear leucocytes died out but the mononuclears developed into large leproma cells. This indicates their macrophage nature.

L. R.

- i. ROSE (F. G.) A New Method of Treatment of Leprotic Infection of the Nasal Mucosa.—*Brit Med J* 1929 Jan. 28 pp 148-149 [1 ref.]
- ii. — The Treatment of Leprosy at the Mahalca Leper Hospital, British Guiana.—*British Guiana Rep Surgeon General for Year 1927* Appendix B pp 66-70
- iii. MARNEFFE (H.) Influence du traitement par les éthers éthyliques de chaulmoogra sur la desquamation des éléments éruptifs de la lèpre [Effect of Treatment by Ethyl Esters of Chaulmoogra on Desquamation in Leprosy].—*Bull Soc Path Exot* 1928 Dec. 12. Vol. 21 No. 10 pp 831-835
- iv. MARKIANOS (J.) L'alépol dans le traitement de la lèpre des rats [Alepol in the Treatment of Rat Leprosy].—*Ibid* 1929 Jan. 9 Vol. 22 No 1 pp 17-19
- v. MARKIANOS (J.) L'alépol dans le traitement de la lèpre humaine.—*Ibid* Mar 13 Vol. 22 No 3 pp 155-156 [1 ref.]

1. This is an important paper in view of the danger of contagion from the nasal discharge of lepers for Dr. Rose has found that by ionization of the infected nasal mucous membrane with 1 per cent. solutions of the sodium salts of *Hydnocarpus wightiana* oil, alepol (sodium hydnocarpate) or potassium iodide the number of lepra bacilli in the nasal discharge is reduced in 10 to 14 days, and they often disappear altogether eliminating the infectiveness of many of the patients. A galvanic battery with small button electrodes wrapped in absorbent wool dipped in the solution is used. A current of 20 to 30 milliamperes for 20 to 30 minutes in each nostril separately was

used, and three or more sessions at two-week intervals were usually required to clear up the local infection although unpleasant, the treatment is well borne even by children. Twenty-five patients were treated, including 13 in whom only nasal infection remained after general chaulmoogra derivatives treatment, and 19 have become negative to repeated microscopical examinations of the nasal mucus over two months and in six more only very scanty organisms were occasionally found. Alepol was mainly relied on, but further observations are required to ascertain if the effects are permanent.

ii. Dr Rose also reports on the work of the Mahaua Leper Asylum of British Guiana during 1927 where the daily average inmates numbered 294 and he estimates the total lepers in the colony at about 350 or 1.1 per mille of the population. A table of the lepers repatriated to India from 1906 to 1928 totals 268 an important factor in keeping down the numbers. At the end of 1927 the Institution contained 345 patients who were undergoing treatment, of which no less than 66 were considered as cured and had been conditionally discharged subject to periodic medical examination a very good result of the modern treatment.

iii. The author reports his experience in the Hygiene Institute of French Guiana of treatment of lepers with chaulmoogra ethylesters intramuscularly and he regards the reactions in the form of increased desquamation of macules and nodules as an indication of the efficacy of the drug and as a prelude to retrogression of the lesions with a favourable prognosis.

iv. Dr Markianos reports on the treatment of rat leprosy with alepol, and he finds it has a definite influence in destroying the lepra cells with breaking down and elimination of the bacilli, which are not themselves destroyed.

v. The same worker reports on the use of alepol in two cases of human leprosy in Professor MARCHOUX's laboratory in Paris, and he concludes that it seems to exert a favourable action in some recent cases, but slow absorption makes intermissions of long usage advisable.

L. R.

SULEK ("") Vier geheilte Lepröse [Four Cured Lepers].—*Dermat. Woch.* 1929 Jan. 19 Vol. 88. No. 3. p. 99.

This brief paper records the treatment of two macular and two mixed cases of leprosy by a combination of Ol Gynocardium, antileprol, CO, soow and solganal, on the lines advocated by PALDROCK, with promising results.

L. R.

OLFF Die intravenöse Behandlung der Lepra mit Kalium jodatum und ihre Konsequenzen. [The Intravenous Treatment of Leprosy with Potassium Iodide and its Consequences].—*Muench. Med. Woch.* 1929 Jan. 4 Vol. 76. No. 1 pp. 13-15. With 1 text fig. [19 refs.]

The author describes the technique of MURK's potassium iodide treatment for leprosy the reactions which it provokes and the precautions necessary in its employment. He considers it marks a great step forward, consequences of which have not yet been thought out.

These he discusses under three heads Prophylaxis employment in other diseased conditions and legal questions Under the first head he quotes the plan proposed by ROGERS and MUIR in 1925 for reducing the sources of infection to 20 per cent. in 5 years by examining all contacts of known cases for the early symptoms and treating those found to be infected. Besides the diseases already suggested viz bacillary or mycotic infections, diseases that are accompanied by the formation of granulation tissue e.g. actinomycosis and articular (but not pulmonary) tuberculosis the author also thinks chronic forms of psychoneuroses might be successfully treated with intravenous injections of potass. iodide In some circumstances it might also be of use in ophthalmology On the legal side he considers that sufficient proof has already been obtained of the effectiveness of the treatment to justify the abolition of compulsory isolation and quotes the case of British Guiana. The hope of to-day is not in strict isolation of the leper but in the widest publicity for the new successful methods of cure so that patients will come forward voluntarily for treatment as out-patients or in their own homes.

L. R

FUJIIWARA (Akira) [Die Malariatherapie bei Leprakranken.] [**Malaria Therapy in Leprous Patients.**—*Okayama Igakkai Zasshi (Zent d Okayama Med Gesellsch)* 1928 Aug Vol. 40 No 8. pp 1806-1811 [In Japanese German summary p 1812.] (Skin Clinic Univ Okayama.)

The author has observed the clinical course of therapeutic malaria in 12 lepers (6 cases of lepra maculosa, 3 of l. nervorum 1 of l. tuberosa and 2 of l. mixta) for a period of 2-8 months after the inoculation. In this time the patients had 5-13 attacks of malaria.

A few cases improved somewhat after the lapse of 1-2 months from the onset of the attacks both objectively as well as to some extent subjectively but finally they got worse again. In one case of nodular leprosy the bacilli were demonstrable in very large numbers in the nodules 6 months after the malaria therapy There is thus not much to be hoped for from the malaria therapy of leprosy

The seroreaction of the lepers was not affected even when malarial blood showing a positive Wassermann reaction was injected.

L. R.

HASLÉ (Guy) Du chlorure de calcium intraveineux dans le traitement de la lèpre [**Intravenous Chloride of Calcium in the Treatment of Leprosy**].—*Bull Soc Path Exot* 1929 Jan. 9 Vol. 22. No 1 pp 11-17

In Madagascar the author has used slowly administered intravenous injections of 150 cc. freshly prepared 2 per cent. pure calcium chloride in distilled water in two series of 15 injections in one month with an interval of 15 days between the series without any ill effects. Of 27 cases 11 were greatly improved, 11 improved, 4 slightly improved and 1 no effect. Macules lessened or cleared up nodules decreased in size and became softer ulcers rapidly healed in 15 out of 20 such cases and glands became smaller In nerve cases the neuralgic pains

were greatly relieved, but in no case did lost sensation return. In one case of opacity of the cornea sight was considerably improved. The general health was also beneficially affected, and this promising treatment can be combined with other methods.

L. R.

AUDRY (Ch.) & VIER. Action du vaccin chancrelleux (Dmelcos) sur une lèpre tuberculeuse. [Action of Dmelcos Vaccine on Nodular Leprosy].—*Bull Soc. Française Dermat. et Syph.* 1928. May No. 5. pp. 430-432.

The writer reports an advanced nodular case of leprosy treated with benein by 12 capsules of chaunmoogra oil orally daily together with eight intravenous injections every fourth day of dmelcos (Sicard's method) in doses gradually increased from 250 to 775 million bacilli. The latter produced violent congestion of the lesions of the face with serous exudation containing very numerous lepra bacilli, and these reactions are considered to have greatly aided the action of the chaunmoogra oil.

L. R.

JEANSELME (E.) A propos de la communication de MM. C. Audry et Vien [sic] sur l'action du Dmelcos chez un sujet atteint de lèpre tuberculeuse.—*Bull Soc. Française Dermat. et Syph.* 1928. June. No. 6. p. 438.

A nodular leper with some nerve symptoms, who was given six intravenous injections in three weeks of "Dmelcos" in progressive doses of 225 to 675 millions, but without any benefit, in spite of temperature reactions up to 40.6° C.

L. R.

WILSON (R. M.). Industrial Therapy and Leprosy.—*China Med J.* 1929. Jan. Vol. 43. No. 1. pp. 12-15. With 6 figs. on 4 plates.

This short paper describes and illustrates the work of lepers in building neat cottages for their residences, and also two-storied stone offices, etc., and the writer emphasizes the great importance of the exercise of such work in the successful treatment of leprosy in addition to drugs. The illustrations show in a striking manner the skill of the workers.

L. R.

EHARA (Ichiro) Eine neue Diagnostik der Lepra auf Grund der sero-elektrischen Reaktion. [A New Diagnosis for Leprosy based on the Sero-Electric Reaction].—*Okayama-Igakkaï Zasshi (Zent. f. Okayama Med. Gesellsch.)* 1928. Oct. Vol. 40. No. 10 (No. 463). German summary p. 2071. [In Japanese pp. 2067-2070. 4 refs.] [Skin Clinic, Univ., Okayama.]

The method is the same as in the author's herpes experiment (see same journal, Vol. 40. No. 7). The testicles of a rabbit that had been inoculated with the emulsion of the leprosy nodule was removed 4 to 5 days after the inoculation and emulsified with 10 times the quantity of

absolute alcohol. The emulsion when used is diluted with 25-times the amount of physiological salt solution, and to it is then added a tenth of the quantity of inactivated patient's serum.

The method must be carefully followed according to the instructions of KOSAKA, SEKI and KUMAGAI. The particles of antigen migrate at a velocity of 3.4μ per second towards the anode. If normal serum or the serum of other patients is added to the antigen the velocity diminished to an average of 2.61μ . On the other hand leper serum decreases the velocity of the particles very considerably. A velocity of the particles less than 1.8μ per sec. is considered as a positive reaction for leprosy. The average of this velocity was 1.37μ per sec. 137 lepers confirmed these results. Syphilitics must always be excluded for they show a positive reaction. The reaction is exactly the same in lepra tuberosa, maculosa, nervorum and mixta. Also in cases greatly improved clinically as a result of treatment the reaction was still positive.

The antigen was produced directly from the emulsion of the leprous nodule or from the rabbit's testicle that had been injected with leprous blood, but the above-named antigen was best and moreover in that way a large quantity can be produced at once.

L. R

BARRIER (Georges). A propos de deux nouveaux cas de lèpre. Vicissitudes du diagnostic.—*Bull Soc Française Dermat et Syph* 1929 Mar No. 3 pp 210-212. [1 ref]

BEVIS (W M). Lepra Anaesthetica—an Isolated Case.—*U.S. Veterans Bureau Med Bull* 1929 Apr Vol 5 No 4 pp 297-298. [U.S. Veterans Hosp. Northport N.Y.]

FRANCHINI (Giuseppe). Reproducción experimental de la lepra en el mono (Segunda nota).—*Prensa Méd Argentina* 1929 Apr 20 Vol 15 No 32 pp 1423-1424 With 2 text figs. [1 ref] [Inst. of Colonial Path. Univ. Bologna.] Italian version in *Bol Inst Clin Quirón* Buenos Aires 1928 Vol. 4 Nos. 28-31 pp 18-19 With 2 text figs. [See this Bulletin Vol. 26 p 78.]

DA MATTA (Alfredo). Escorço historico da lepra no estado do Amazonas.—*Brasil Medico* 1929 Mar 9 Vol 43 No. 10 pp 249-254 With 3 text figs.

— Os symptomas iniciais das leproses seu contagio e evolucao relativamente rapida.—*Brasil Medico* 1929 Mar 16 Vol. 43 No 11 pp 277-287 With 5 text figs.

REMLINGER (P). La lepra en Marruecos.—*Medicina Paisos Calidos* Madrid. 1929 Mar Vol 2 No 2 pp 122-126 [19 refs]

CHOLERA.

TOMES (J Walker) The Incidence and Significance of Certain Clinical Signs in Cholera.—*Far Eastern Assoc. Trop Med Trans. Seventh Congress British India 1927* Vol. 1 pp 37-38. [1 ref.]

This short paper deals with the clinical signs observed among 1183 cases of cholera occurring in the Aransol Mining Settlement. In 70 per cent. intestinal cramps and abdominal pain are absent. Diarrhoea precedes vomiting in 96 per cent. of cases. Bloody stools occur in cholera in less than 3 per cent. of cases. They are of very favourable prognostic import.

When intestinal cramps and abdominal pain are present they are of somewhat unfavourable prognostic import.

J. H. Tull Walsh.

COMBES (Teofilo) Preliminary Report of the Value of Investigating Diarrheal Diseases for Possible Cases of Cholera and the Necessity of Instituting Prompt Measures.—*Philippine Islands Med. Assoc.* 1929 Mar Vol. 9 No 3 pp. 106-108.

By immediate investigation of all diarrhoeal diseases, possible cases of cholera may be promptly detected, prompt sanitary measures instituted and other diarrhoeal diseases properly eliminated. Also by prompt detection of suspects the spread of the disease may be checked. From this preliminary study it is believed that "Cholera drops" [composition not given] will be of great value. Cholera vaccine should also be employed.

J. H. T. W.

BULLETINS FROM THE INSTITUTE FOR MEDICAL RESEARCH, FEDERATED MALAY STATES. 1929. No. 1 12 pp.—The Control and Treatment of Cholera in the Federated Malay States. A Compilation from Reports by Drs. E. H. Black, F. V. Jacques, W. Young, M. J. Graham, W. J. Vickers, E. C. Chitty, E. A. Struthers, M. F. O'Connor and Messrs. S. Danasamy, P. Ponnampalam, V. Thambiar and E. S. R. Alfred on Cholera Outbreaks at the Quarantine Camp, Port Swettenham (1925, 1926) and in the State of Perak (1927).

This Bulletin does not contain descriptions of any very novel features in the control and treatment of cholera. It is but a record of the work of the Federated Malay States Medical Department in the face of cholera epidemics. These notes have been prepared at the request of the Principal Medical Officer for the guidance of those medical men in Malaya who may come into contact with cholera for the first time. The brief sections deal with general sanitary measures, prophylaxis, complications and treatment. Instructions are given for collecting and forwarding specimens for bacteriological examination.

J. H. T. W.

PEVERELLI (P) De cholera te Batavia (II) Enkele aantekeningen betreffende beloop en epidemiologie. [Cholera at Batavia (II.) **Remarks on its Course and Epidemiology**].—*Geneesk Tijdschr v Nederl Indië* 1928. Vol. 68 No 7 pp 953-972. [13 refs.]

Like the first part of this article the second covers mostly subjects dealt with in another paper in a more concise way (*ante* p 85). A few points still deserve attention. Since 1918 no cholera had been seen at Batavia, though all suspicious cases have been subjected to careful examination therefore the outbreak following the arrival of a cholera infected ship from Singapore makes it fairly certain that the epidemic originated there.

Vaccination met with very little resistance in the native population which, on the contrary seems to attribute to it various natural and supernatural blessings.

The improved water supply of Batavia may partly account for the town's freedom from cholera and for the light course of this epidemic in latter years.

W J Bais.

WOLTER (Friedrich) Die Hauptgrundgesetze der epidemiologischen Choleraforschung in ihrer Bedeutung für die Aetiologie der Cholera auf Grund einer vergleichend-epidemiologischen Betrachtung einer grösseren Reihe von Epidemien und mit besonderer Berücksichtigung des Choleraausbruchs in London Golden Square (Broadstreetpumpe) im Jahre 1854 [The Foundations of Cholera Research. **Pettenkofer Memorial Essay**].—*Pettenkofer Gedenkschrift* Munkh. 1928 Vol. 8 No 1 pp 1-56 With 1 folding map [Refs in footnotes.]

The author deals with several outbreaks of cholera in the nineteenth century beginning with the London epidemic in Golden Square 1854 which was traced to contaminated water in the Broad Street pump. He considers that the work of SNOW was the corner-stone of modern hygiene. Other early workers and other epidemics are alluded to but the essay is in the main an appreciation of the work and theories of MAX VON PETTENKOFER. When PETTENKOFER set forth his theories of the causation of cholera typhoid and other intestinal diseases he was a pioneer. His germ theory of cholera was confirmed by KOCH's discovery and isolation of the common bacillus — *V. cholerae*. A diagnostic table of the bacilli of the typhoid-coli group is given. This essay does not, of course, contain any new facts but it is of great historical interest. [For an account of the life and work of Max von PETTENKOFER see this *Bulletin* Vol 24 p 342 (HOME)]

J H T W

GANGULY (Lal Behary) Present Day Treatment of Cholera.—*Far Eastern Assoc Trop Med Trans Seventh Congress British India* 1927 Vol. 1 pp 32-36.

The author states that about 1000 cases of cholera are treated annually at the Campbell Hospital, Calcutta. These all come from the poorer classes ill nourished and ill fed often anaemic and cachectic,

steeped in an insanitary environment. They come at all stages of the disease often 12 to 24 hours after the onset and almost all in a state of profound collapse. Even amongst such a desperate lot of cases they get a recovery rate of fully 80 per cent. The treatment consists of judicious administration of saline transfusions given freely if the specific gravity of the blood is high—1064 or so—but if in the presence of collapse, the specific gravity is moderate saline is given intravenously in small amounts. To check uraemia a strong solution of bicarbonate of soda 160 gra. with 80 gra. of sodium chloride to the pint is used. For treatment of serious cardio-vascular depression pituitrin and adrenalin have been extensively used, with atropine and caffeine for grave cardiac depression.

J. H. T. W.

HAHN (Martin) & HIRSCH (Julius) Die Enterotropie und die parenterale Wirkung des Choleragiftes. (III. Mitteilung.) [Enterotropism, a Parenteral Action of Cholera Toxin.]—*Rhs. Woch.* 1928. Dec. 23 Vol. 7 No. 52. pp. 2483-2484 With 1 text fig. [2 refs.]

Intravenous injection of living cholera vibrios is known to produce a fatal diarrhoea in young rabbits, and smears made from blood, intestine and gall bladder give pure cultures of vibrios. Neither by oral feeding nor by injection of living vibrios into the intestine have the authors succeeded in producing an infection. Their experimentation has been on similar lines with cholera toxin instead of living vibrios and has had similar results. Thus intravenous injection of cholera toxin in young rabbits is followed within an hour by profuse diarrhoea and the death of the animals with depression of body temperature. These animals lose fluid to the extent of 10 to 17 per cent of the body weight. Here also introduction of toxin by the mouth or directly into the small intestine is without effect. The action of the toxin on peristalsis is remarkable. An isolated loop of intestine with a cannula at either end and immersed in Tyrode solution, had toxin run through it without any effect on peristalsis. When, however the toxin was added to the fluid in which the loop was suspended, so as to act on the external surface, it paralysed peristalsis. Cholera toxin then is inactive by enteral and active by parenteral administration.

W. F. Harvey

HIRSCH (Julius) Der Stoffwechsel des *Vibrio cholerae* bei aerobier und bei anaerobier Züchtung. [Metabolism of the Cholera Vibrio in Aerobic and Anaerobic Culture.]—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Dec. 15 Vol. 109 No. 2. pp. 387-400 With 2 text figs. [Refs. in footnotes.] [Hyg. Inst., Univ. Berlin.]

Investigation on this subject has already been published by the author (see this *Bulletin* 1927 p. 45).

The results obtained are (1) Obligatory aerobic growth upon a carbohydrate-free amino-acid medium, as in peptone solutions, is dependent entirely upon the chemical composition of the substrate and is not a specific peculiarity of the organism. (2) The cholera vibrio can grow under strict anaerobic conditions as soon as carbo-

hydrate to furnish an anoxybiotic source of energy is added to the medium (3) Carbohydrates are preferred as a source of energy to amino-acids both under aerobic and anaerobic conditions (4) Amino-acids are chiefly important in sugar containing media as sources of nitrogen (5) Under anaerobic conditions with carbohydrate present a slight de-aminization of aspartic acid gives one molecule of ammonia and succinic acid (6) Under aerobic conditions a smaller part of the sugar undergoing decomposition is burnt the greater part is fermented (7) The anoxybiotic splitting of the glucose by the cholera vibrio does not proceed in one way only Two types of independent reaction are shown the one in which lactic acid is produced and the other in which formic acid acetic acid and ethyl alcohol are produced.

The important conclusion is arrived at that the obligate aerobic growth of the cholera vibrio as it occurs in peptone water does not represent its natural mode of growth in the infected intestine but that this corresponds to anaerobic growth in a glucose containing medium. Detailed methods of investigation of these points are described in an appendix.

W F Harvey

FUJIMORI (K.) Ueber den biologischen Unterschied zwischen dem nativen und dem gekochten, in Wasser gelösten mikrobiotischen Antigen von Cholera-vibrionen. I Mitteilung Ueber den Unterschied bei Erzeugung des Agglutinins und Bakteriolyins [Difference in Action between Heated and Unheated Cholera Antigen. I. In Respect of Production of Agglutinins and Bacteriolysins.]—*Cent f Bakt I Abt Orig* 1929 Feb. 16 Vol. 111 No 1/3 pp 68-83. With 10 text figs. [6 refs] [Surg Clinic Imperial Univ Kyoto]

The test materials of this research were (1) A cholera vaccine containing 0.0007 cc. of bacterial substance per cc. (2) a filtrate through a bacterial candle of a 24-hr bouillon culture which had been kept for 5 days in an ice chest This filtrate was used unheated and after heating for 20 60 and 120 minutes at 100 C Differences of immunizing action between these materials singly or in combination are explained on the basis of the impedin theory The results obtained are given as —

(1) Immunization success as gauged by production of agglutinins and bacteriolysins showed that vaccine alone was equal in efficacy to vaccine in combination with unheated filtrate and that both of these were progressively less and less efficacious than vaccine with bouillon, vaccine with filtrate heated at 120 C, vaccine with filtrate heated at 60 C, and vaccine with filtrate heated at 20 C. (2) The minimum lethal doses of vaccine unheated filtrate and heated filtrates were 6 cc., 12 cc., and 17 to 18 cc. respectively it was in this serial order that when used in doses of $\frac{1}{4}$ and 1-20th minimum lethal dose they gave rise to degrees of hypoleucocytosis or hyperleucocytosis. Hypoleucocytosis for the larger dosage and hyperleucocytosis for the smaller may be taken as measures of toxicity (3) Since the combination vaccine with unheated filtrate gives rise practically to the same variations in the leucocyte count as vaccine with filtrate heated for 20 minutes it follows that the better immunization success obtained with heated filtrate can not depend upon its toxicity component but

must be referred to antigenic capacity. This greater antigenic capacity must be due in the first place to the great thermostability of the antigenic substances, and, secondly to the inactivation by heat of the "impedin" contained in the unheated filtrate.

Impedin is regarded as combined with bacterial protein and as exercising an inhibitory influence upon antigenic activity. It is more thermostable than bacterial toxin, but less so than antigenic substance.

W F Harvey

FUJIMORI (K.) Ueber den biologischen Unterschied zwischen dem nativen und dem gekochten in Wasser gelösten mikrobiologischen Antigen von Cholera-vibrien. II. Mitteilung Ueber die Impedimentscheinung der spontanen Phagozytose. [Difference in Action of Heated and Unheated Cholera Antigen. II. The Impedin Phenomenon and Spontaneous Phagocytosis.]—*Zent. f. Bakt. I. Abt. Orig.* 1929 May 10 Vol. 112 No. 1/2 pp. 11-16. With 3 text figs. [7 refs.] [Surg. Clinic, Imperial Univ. Kyoto.]

In the first communication (above) this subject was treated from the point of view of production of agglutinins and bacteriolysins by cholera vaccine in conjunction with heated and unheated filtrates of cholera cultures. This second communication deals with the identical results obtained in respect of the spontaneous phagocytosis of staphylococci, occurring upon injection into the circulation of staphylococcus suspension along with cholera filtrate. In this set of experiments the greatest phagocytosis was obtained in the case of mixture of suspension with filtrate heated for 20 minutes at 100° C. and less and less phagocytosis from mixtures with filtrate heated for 60 minutes, 120 minutes and unheated respectively. The same argument is used as before, that this difference is not due to the relative toxicity of the filtrates seeing that, when injected, they evoke much the same degree of leucocytosis, but is due to the presence of a comparatively thermostable "impedin" or inhibitory substance in the unheated filtrate. With minuter examination of effects, it is found the unheated filtrate gives rise to a somewhat greater total leucocytosis, while filtrate heated for 20 minutes gives a greater percentage polymorph leucocytosis.

W F Harvey

TORIKATA (R.) & UYEDA (O.) Experimenteller Vergleich des Nativimmunogens mit dem koktoimmunogen von Cholera-vibrien unter besonderer Berücksichtigung der Toxizität und der immunisatorischen Erfolge. [Comparison of Unheated and Heated Cholera Antigens with Special Reference to their Toxicity and their Immunizing Power.]—*Zent. f. Bakt. I. Abt. Orig.* 1929 May 10 Vol. 112 No. 1/2 pp. 91-108 [Refs. in footnotes.] [Torikata Inst. for Immunity Research, Osaka.]

Seven-day bouillon cultures of cholera vibrio were carbolyzed at 0.5 per cent left for 3 days at room temperature, and then centrifuged at high speed. The clear supernatant fluid was used as unheated filtrate and the carbolyzed unheated culture as unheated "vaccine."

Heated antigen was obtained by heating the bouillon culture for 20 minutes at 100° C. and then carbolizing at 0.5 per cent. The heated filtrate and heated vaccine were then prepared in the same way as the unheated antigens. Experiments with these preparations showed that (1) Heated antigen produced, *ceteris paribus* a larger precipitate than unheated (2) the minimum lethal doses of the unheated antigens were smaller than those of the heated antigens (3) unheated filtrate and vaccine produced a greater quantity of agglutinin and bacteriolysin in the blood than heated filtrate and heated vaccine if administered in equal cc. doses (4) if however these antigens were administered not in equal doses but in doses of an equal degree of toxicity (1/5 or 1/10th lethal dose) then the heated antigens produced a greater quantity of agglutinins and bacteriolysins than the unheated (5) the assessment of antigenic capacity by means of the *in vitro* tests of precipitation and complement fixation altogether leave out of account the toxicity of the antigen. The *in vitro* result is brought into line with *in vivo* effect, if the antigen in the latter case is injected in doses of equal toxicity

W F Harvey

MARRAS (F. M.) Sulle emolisine dei *Vibroni colerigeni*. [The Haemolysin of the Cholera Vibrio].—*Ann. d'Igiene* 1929 Apr Vol. 39. No 4. pp. 249-254 [5 refs.]

The technique used was to mix 1 cc. of the filtrate of a 72-hour culture in peptone water with 1 cc. of a 2½ per cent. suspension of sheep erythrocytes. The test tubes were kept in the incubator at 37° C for 4 hours and in the ice chest for 24 hours. Strains freshly isolated from cholera cases in Calcutta were found to be haemolytic. The haemolytic power was not related to agglutinability nor to the cholera red reaction. Some of the strains isolated in Calcutta and possessed of haemolytic character were found to be deprived of this character some months later. The author concludes that presence or absence of haemolytic power is not a criterion by which to differentiate cholera from non-cholera vibrios.

W F Harvey

URBAIN (Achille) Infection cholérique expérimentale par la voie intra rachidienne. Essai de vaccination locale de la cavité méningée contre le vibron cholérique. [Experimental Cholera by the Intraspinal Route. Local Vaccination of the Meningeal Space].—*C R Soc. Biol* 1929 Apr 19 Vol. 100 No 12. pp. 991-994 [3 refs.]

The strain of *V. cholerae* used was not highly virulent. It produced in the rabbit, on intravenous injection of 1-10th agar culture paralysis and diarrhoea in 3 to 4 days and death on the 5th or 6th day. But the same weak strain when injected subdurally through the occipito-atlantal ligament in a dose of only 1-8,000 to 1-12,000th of an agar culture gave rise to a cholera septicaemia and either death in 24 hours or severe meningo-encephalitis. Once the minimum lethal dose was established, experiments were done to test the possibility of effecting local immunization by means of cholera antiviral. Thus for example,

a rabbit of 2,000 gm. received intraspinally 0.5 cc. of cholera antivenus. On the following day this animal and a control were inoculated by the same route with 1-5 000th agar cholera culture. The control animal died of cholera septicaemia in 36 hours while the immunized animal survived. This is a case of specific immunization, for neither other antivenuses nor ordinary bouillon afford any such protection.

W F Harvey

SOUCHARD (L.) Fonctionnement du laboratoire des vaccins à l'Institut Pasteur de Saigon au cours de la campagne anticholérique 1927-1928. [Large-scale Manufacture of Anticholera Vaccine at the Pasteur Institute, Saigon.]—*Arch. Inst. Pasteur d'Indochine* 1928. Oct. No. 8. pp. 23-39. With 2 graphs, 1 plan & 6 figs. on 3 plates.

This is a detailed account of how great difficulties were successfully surmounted in reorganizing the vaccine department of the Pasteur Institute at Saigon. It was able in less than 3 months to cope with a demand for cholera vaccine which represented a 100-fold increase on the original annual output.

W F Harvey

PEVERELLI (P.) Cholera in Batavia. Some Notes concerning its Progress and Epidemiology.—*Nederl. Dierst. d. Volksgezondheid in Nederl.-Indië*. 1928. Vol. 17. Pt. 4. pp. 594-622. With 2 diagrams. [13 refs.] [Med. Lab. Weltevreden.]

— De cholera te Batavia (I). Enkele aantekeningen betreffende beloop en epidemiologie. [Cholera at Batavia (I). Some Notes on its Course and Epidemiology.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1928. Vol. 68. No. 5. pp. 606-680.

These papers do not differ in essential matters from the paper already summarized in this *Bulletin* ante p. 85.

J H T W

ANDO (K.) On the Outbreak of Cholera on Board S.S. "Hawaii Maru" and the Persistence of *V. cholerae* in the Stools of Contacts.—*Japan Med. Week.* 1928. Oct. 15. Vol. 8. No. 10. pp. 268-270.

PALMER (F. J.) Investigations in Sporadic Cholera, 1928.—*Jl. Trop. Med. & Hyg.* 1929. Apr. 1. Vol. 32. No. 7. pp. 93-97.

PLAGUE

ROGERS (Leonard) *The Yearly Variations in Plague in India in Relation to Climate Forecasting Epidemics.*—*Proc Roy Soc Ser B* 1928 May 1 Vol. 103 No 721 pp 42-72. With 1 map in text & 4 folding plates [7 refs] [Summary appears also in *Bulletin of Hygiene*]

Plague in India has a definite annual seasonal incidence in the same area although the months of maximum prevalence vary in different provinces. In this study of plague incidence in relation to climate it is shown that the seasonal incidence in different areas of India may be explained by the seasonal variations in the mean temperature and humidities (the latter expressed as saturation deficiencies). They appear to act through their influence on the life of the rat fleas which convey the infection to man.

The mean monthly temperature variations in the hot weather and monsoon periods influence the subsequent plague incidence by high temperatures reducing and low ones favouring the prevalence of the disease.

The saturation deficiencies both in the two hot seasons and in the early and late cold weather ones influence the incidence of plague. Low saturation deficiencies appear to be favourable and high saturation deficiencies unfavourable to the disease. For the three northern plague areas of the Punjab, the United Provinces and Bihar the author considers it is possible to forecast to a large extent the more important yearly increases and decreases of the disease from a knowledge of the variations in these climatic factors.

In the Deccan area of Bombay with an early monsoon increase of plague and but slight yearly hot season temperature variations the yearly variations in plague are more dependent on the saturation deficiencies during the plague season so forecasts are of less value [v this *Bulletin* Vol 25 p 315 (DOORENBOS) p 317 (FORSTER)]

H M Woods

DUFFAU & LALLEMENT *Considérations sur une épidémie de peste à Oran.* [*Plague in Oran.*].—*Bull Soc Path Exot* 1929 Mar 13 Vol. 22 No 3 pp 193-200 [Oran Hosp Oran Algeria.]

This outbreak presents the usual features. Most of the cases were bubonic plague but septicæmic plague occurred in two cases and a focus of pneumonic plague was found among two closely related families. Anti plague vaccination was practised from the start and 3,327 persons were protected. Thanks to this and the sanitary measures taken the epidemic was suppressed in about a month.

J H Tull Walsh.

MARINO (Vincenzo) *Note ed osservazioni su un episodio di peste bubbonica* [*Bubonic Plague*].—*Polichinico Ser Prat* 1929 Jan. 21 Vol. 36 No 3 pp 77-81

Under the direction of the Director General of Public Health the author had the opportunity of observing a small outbreak of bubonic plague in Tripolitania, where plague is not endemic and is not often

seen. Of 36 cases 12 died and the epidemic was over in a month. The actual cause was not traced and there was no plague among the rats that were killed and examined. The author suggests that healthy human carriers might have introduced the disease [this *Bulletin*, Vol. 24 p. 34 (LEGER) p. 833 (NIKAXOROW)].

J. H. T. W.

MEIHUIZEN (F. H.) Een kleine Pestepidemie. [A Small Epidemic of Plague.]—*Geneesk. Tijdschr. v. Nederl. Indië*. 1929 Jan. 21 Vol. 69 No. 1 pp. 60-62.

In about a week's time 5 members of a Chinese family at Poerwokerto (Java) and 2 of their Javanese servants died from an acute febrile disease with rapid and serious involvement of the heart's action. One of the servants had returned sick from Boembojoe where plague was prevalent at that time. The author saw the last 2 of these 7 cases, and, suspicious of plague, made a puncture of the spleen of the last patient after death. The examination of the spleen juice however yielded negative results. The diagnosis was only established when after four days the Amboinese nurse who attended the last patient, developed pulmonary plague ending fatally in 5 days and confirmed by bacteriological finding of the plague bacillus. Apparently no further cases occurred.

In view of the fatal course of all the cases the author's therapeutical suggestions appear hardly worth mentioning.

W. J. Bant.

TAUCHIYA (H.) & CHUAN (Li Te) [On Pest Epidemic at Chienchiatian, Inner Mongolia.]—*Jl Oriental Med*. 1929 Mar Vol. 10 No. 3. [In Japanese. English summary pp. 33-37. 4 refs.] Hyg. Inst. of S. Manchuria Riv. Co. Dairen.]

The epidemic described in this paper lasted from the end ten days of August to the middle of November 1928. The population of Chienchiatian was about 1,300 and 400 cases of bubonic plague occurred. Mortality 97.4 per cent. As is generally the case in Mongolia and other parts of China, buboes were very common in the cervical, submaxillary and axillary glands.

J. H. T. W.

GARRETT (Francis E.) Report of a Case of Plague.—*Milit. Surgeon* 1929 Jan. Vol. 64 No. 1 pp. 93-97.

The case was that of an enlisted man on duty in the C.M.T. camp at Del Monte, California. No history was obtainable from the patient as he was unconscious on admission, July 26th, 1928. He died at 8 p.m. July 27th. The left inguinal glands were enlarged. When the case was reported the County Health Officer stated that there had been epizootic plague among the ground squirrels about eight miles from the camp, and later investigations indicated that plague existed among squirrels within the camp area. The camp was closed on July 29th. The regular troops were returned to their proper stations and the C.M.T.C. students were sent to their homes. Following the death from plague at Camp Del Monte, a survey was made of the National Guard camp area at San Luis Obispo, where 20 per cent. of the ground squirrels were found to be infected. Eradication measures were promptly instituted and no human cases developed in the camp.

J. H. T. W.

HEMPHILL (R) Notes on a Case of Plague in Aden.—*Jl Roy Army Med Corps* 1928 Nov Vol 41 No 5 pp 374-376 With 1 chart in text.

During a serious outbreak of plague in Aden from January until May 1928 1 494 cases were recorded among the native population, with 1 107 deaths. Only one case occurred in the British garrison, the whole of which was protected by inoculation with Haffkine's anti plague vaccine shortly after the commencement of the epidemic. This case is reported in detail. It was a severe case with high temperature delirium and buboes which were opened and drained. On the fifth day an intravenous injection of 20 0 cc of a 1 per cent. solution of mercurochrome was administered and amelioration of symptoms followed. The buboes healed and the soldier made a good recovery.

J H T W

i URIARTE (Leopoldo) & MORALES VILLAZÓN (N) La profilaxis contra la peste bubónica. Un decenio de investigaciones en las ratas. [Prevention of Bubonic Plague.]—*Rev Inst Bacteriológ* Buenos Aires. 1928 Mar Vol. 5 No 2. pp 149-175 Annexure pp 181-197 With 7 figs & 2 plates [5 refs.] English summary pp 177-179

ii — Sobre profilaxis antipestosa y rat proof ["Rat-Proof" Prevention.]—*Ibid* pp 198-213 With 1 plan 1 coloured plate & 39 figs English summary pp 214-215

i. The paper describes the well-known methods by which the plague infection is spread. In the Argentine the centres of bubonic plague have always originated by direct contagion from rats or by handling goods contaminated by rats. Since 1914 there has existed in the Port of Buenos Aires a service of deratization depending on the National Bureau of Hygiene. The rats which are captured daily due precautions being taken against contagion are sent to the Plague Section of the Bacteriological Institute and examined every day. This paper refers to observations made from 1916 to 1926. The usual pathological signs were generally found, but it was shown that rats without any evident marks of disease were bearers of virulent *Pasteurella pestis*. It was always necessary to confirm the autopsy by bacteriological examination. During the years covered by these investigations epizootics have been very rare in the Port of Buenos Aires.

ii. This paper advocates prevention of plague by making buildings rat-proof especially all buildings used for storage of food and grain. Plans and drawings are given of a specially designed rat proof building for storage of grain etc.

J H T W

PHILLIPS (W) Les risques actuels de diffusion de la peste dans la Chine du Nord. [Spread of Plague Risks in N China.]—*Bull Office Internat d Hyg Publique* 1928 Dec. Vol 20 No 12 pp 1948-1950

The author is Medical Officer to the British Consulate at Newchwang. He notes that the marmots of Eastern Mongolia and Transbaikalia form a permanent reservoir for plague especially the tarabagan trapped for the sake of the skins. Every year plague appears. Generally the

epidemics are localized some trappers die or a village may be exterminated but owing to isolation by distance and difficulty of communications the disease remains localized. With the building of railways the situation is changed. Plague will spread more rapidly especially that most fatal form pneumonic plague which passes direct from man to man. The author calls upon the Chinese authorities to make arrangements for inspection of railways and for prevention of risk of transmission of plague.

J. H. T. W.

SYKINE (A.) La peste en Transbaikalie et l'organisation antipestense transbaikalienne [Plague in Transbaikalia and the Organization to combat it.—*Bull. Office Internat. d'Hyg. Publique* 1928 Oct. Vol. 20 No. 10 pp 1604-1608. With 1 map. [2 refs.]

Plague habitually appears in Transbaikalia every year. The outbreaks are small and often quite isolated. The one exception was 1910 when there were 44 000 victims. A table is given showing the number of cases from 1919 to 1928. They vary from two in 1919 to 57 in 1921. The source of infection is generally the tarabagan. During the years of civil war the anti-plague organization was abolished, but it was reconstituted in 1923 and now consists of a laboratory at Chita, a travelling detachment possessing a laboratory wagon and four other wagons, and a medical plague station at Borzja. In 1924 an anti-plague laboratory was established in the bacteriological institute at Irkutsk.

J. H. T. W.

FIALHO (Amadeu) Estudos sobre a peste. Primeira Nota. Qual a sobrevivencia dos bacillos pestosos nas cobaias inoculadas experimentalmente [Studies in Plague.]—*Archivos de Hyg.* Rio de Janeiro. 1928. May Vol. 2. No. 1 pp 19-26. English summary facing p. 26.

This paper consists of experiments on guinea-pigs. They were infected by rubbing the organs of plague animals into the shaven skin. At temperatures between 20.8° and 23.8° C. plague bacilli were isolated from the bodies of the infected guinea-pigs until the third day after death.

J. H. T. W.

GIRARD (G.) L'enseignement de l'hémoculture dans la peste pulmonaire primitive de Madagascar [Haemoculture in Primary Pneumonic Plague.]—*Bull. Soc. Path. Exot.* 1929 Apr. 10 Vol. 22. No. 4 pp 234-239 [4 refs.] [Pasteur Inst., Antananarivo.]

The author describes twelve cases of primary pneumonic plague treated at Antananarivo in 1927 and 1928. In seven the results of haemoculture were negative in five positive. All the patients died. Contacts were examined by the method of blood culture, but the plague bacillus was never found. In all the cases bacilli were found in the sputum.

J. H. T. W.

BICHKOV (V) & BORZENKOV (A.) [On the Determination of Plague-Infected Fleas by the Method of Preparation and Seeding of the Isolated Alimentary Canal.]—*Rev Microbiol Epidemiol et Parasit* 1929 Vol. 8 No 1 pp 20-32. With 14 text figs. [14 refs] [In Russian. English summary pp 112-113] [Anti Plague Lab Stalingrad.]

The fleas are treated for one minute with 96 per cent alcohol, which is then washed off with normal salt solution. A tear is made in the chitin integument of the body the head and oesophagus separated with a needle the posterior part of the insect cut off and the stomach removed through the anterior part of the body. Examination of the blocked proventriculus of a plague-infected flea shows that it has an enlarged dark lumen and atonic walls instead of walls with normal alveolar structure. The contents of 60 to 70 of these stomachs may be made into a suspension and sown on a nutrient medium, by which means a culture test may be applied to large numbers of fleas for the detection of plague infection. If by this means blocked fleas are detected in any locality this shows that an epizootic of plague has been in existence there. Fleas can act in the intervals between epidemics as reservoirs of plague.

W F Harvey

SKORODUMOV (A.) [Ueber den Einfluss des Gefrierens und Tauens auf das Wachstum und die Virulenz des Pestmicroben.] [Influence of Frost and Thaw on the Growth and Virulence of Plague Organisms.]—*Rev Microbiol et Epidemiol* 1928 Vol. 7 No 3 pp 280-284. With 1 chart in text. [In Russian. German summary p 339] [Bact Inst. Irkutsk.]

The conditions were those naturally prevailing during winter in Irkutsk and the cultures investigated were obtained from dead guinea pigs. Sometimes plague cultures could not be obtained sometimes they were enhanced in virulence and sometimes diminished. With artificial temperature variation up to 45° C it was found that some cultures lost not only their virulence but also their capacity for growth, while others preserved both of these.

W F Harvey

BEZSONOVA (A.) [On Two Variations of *B. pestis* in Relation to Glycerin.]—*Rev Microbiol et Epidemiol* 1928 Vol. 7 No. 3 pp 250-253 [7 refs.] [In Russian. English summary pp 336-337] [State Inst. of Microbiol. & Epidemiol. for S E of U.S.S.R.]

The strains of *Past. pestis* examined were 145 Russian from various sources and 4 obtained from outside Russia. All the Russian strains fermented glycerin and all the foreign strains failed to do so. Nor did continued subculture on glycerin medium effect any alteration in these characters. Fermentation of glycerin by *Past. pseudotuberculosis rodentium* is supposed to be a character distinguishing it from *Past. pestis* but this research negatives its utility for this purpose.

W F Harvey

BERONIKOV (V) [On the Influence of Fixation and Staining on the Vitality of Plague Bacillus].—*Rev. Microbiol., Epidemiol. & Parasit.* 1929 Vol. 8. No 1 pp. 33-39 [In Russian. English summary pp. 113-114.]

Fixation of smears in the flame (4 or 5 times) in ethyl alcohol (up to 2 minutes) or in alcohol-ether mixture either do not kill or are uncertain of result. On the other hand, fixation with ethyl alcohol (30 secs) and subsequent burning off the alcohol or fixation in methyl alcohol (10-15 secs.) almost invariably kills the plague bacillus. Ziehl's fuchsin (1:10) is more lethal than Loeffler's methylene blue and may kill the plague bacillus in unfixed smears within a minute.

W F Harvey

FLU (P.) Immunisation des rats blancs et des cobayes contre la peste expérimentale au moyen d'un extrait aqueux de bacilles pesteux virulents. [Immunization of White Rats with Aqueous Extracts of Virulent Plague Bacilli].—*C. R. Soc. Biol.* 1929. Apr. 8. Vol. 100 No. 11 pp. 835-837

— Immunisation des rats blancs contre la peste expérimentale au moyen des bacilles pesteux virulents lyés, en suspension concentrée par des bactériophages anti-pesteux. [Immunization of White Rats with Plague Bacilli lysed by Anti-Plague Bacteriophage. —*Ibid.* pp. 837-838 1 ref.] [*Trop. Inst. Univ. Leiden.*]

In the first of these papers there are given the results obtained with subcutaneous injection of aqueous extracts of plague bacilli in white rats. Thirty rats were used, nine died in the course of a 3-dose treatment and the 21 remaining rats survived, 3 weeks after their last prophylactic injection, an inoculation of 100 times the lethal dose of living plague bacilli. The great objection to this procedure is the reaction caused.

In the second paper a different type of vaccine was employed, which was prepared as follows —

Bouillon of pH 7.6 was sown with 1.3 billion plague bacilli per cc. from a 24-hour culture and then with 0.2 cc. of a very active antiplague bacteriophage per 10 cc. bouillon. If lysis had not taken place in this mixture after 6 hours at 30° C an additional 0.1 cc. bacteriophage per 10 cc. bouillon were added. Incubation was for 12 hours at 30° C., after which phenol was added to a strength of 0.5 per cent. This vaccine was then heated for 4 hours at 44° C and left at room temperature for 5 days.

Three subcutaneous injections 0.5, 1 and 1.5 cc. were given at intervals of 4 or 5 days. The results were that 91.2 per cent. of rats were immunized against 40 lethal doses and 28.3 per cent. against 400 lethal doses. The control animals all succumbed on test. Local and general reactions were absent with this vaccine.

W F Harvey

HAUDUCROY (Paul) & GRAHLE (Ali) Présence du bactériophage anti-pesteux à Paris. [Antiplague Bacteriophage in Paris].—*C. R. Soc. Biol.* 1929 Apr. 28. Vol. 100 No. 13 pp. 1065-1066.

Eleven sewer rats were examined. Suspensions were made of the triturated organs, blood and faeces and these were filtered separately

In the blood and the faeces of only one of these rats was a plague bacteriophage found, lysing a bouillon culture in 10 to 12 hours furnishing clear plaques on agar and transmitting its activity in series. The potency of the bacteriophage increased with passage. Filtrates of cultures gave rise in certain cases to secondary cultures thus confirming the existence of a filtrable form of *Past pestis*.

W F Harvey

COMPTON (Arthur) Sensitization and Immunization with Bacteriophage in Experimental Plague.—*Jl Infect Dis* 1928 Nov Vol 43 No 5 pp 448-457 With 1 text fig [8 refs] [Public Health Labs Alexandria Municipality Egypt]

These experiments were carried out with a strain of bacteriophage which was not one of maximum virulence otherwise the results might have been better. Maximum virulence for phage is defined as ability to lyse completely in 4 to 5 hours at 37° C a 1 to 2 thousand million suspension of *Past pestis* in broth.

One experiment on mice was made to test the therapeutic effects of phage after infection and failed to show any curative effect. In the second experiment 6 mice were used three phage inoculated and three controls with test dose of plague 4 days later. The inoculated animals died on the 2nd, 4th and 9th day and the controls on the 3rd, 3rd and 4th days. A third experiment in prophylaxis used 15 mice, in groups of 5, 6 and 4 for phage inoculated, vaccine inoculated and control respectively. All of these died except two which survived in the phage group. The author considers the results promising for phage prophylaxis and forestalls criticism of his paucity of numbers by stating that this study of immunity will require to be worked out still more fully and confirmed on a much larger scale before being finally accepted.

W F Harvey

BOQUET (A) & DUJARDIN BEAUMETZ (Ed.) Sur les relations entre le bacille de la peste et le bacille de la pseudo-tuberculose des rongeurs. [Relationship between the Plague Bacillus and the Pseudotuberculous Bacillus of Rodents].—*C R Soc Biol* 1929 Mar 8 Vol. 100 No 9 pp 625-627

The subject of the identity of these organisms has received much attention of late. Serological experiments by the authors relating to precipitins agglutinins and complement fixation with the sera of the sheep and the fowl point in general to a close antigenic relationship with some differences. Protection experiments likewise gave indication of this relationship. Thus sterile suspensions of *Past pseudotuberculosis* injected subcutaneously immunized 6 guineapigs out of 10 against a test dose of the same organism which proved fatal for the controls in 5 days. MACCONKEY had shown that guineapigs immunized to *Past pseudotuberculosis* were equally resistant (10 out of 12) to subcutaneous inoculation of *Past pestis*. On the other hand, guineapigs which have been immunized successfully to plague are not then immune to infection by the pseudotuberculosis bacillus. The conclusion is reached that if these two organisms possess common antigenic characters the *Past pseudotuberculosis* is more active than the plague bacillus in the

production of antibodies and confers a more efficacious immunity upon the guinea-pig against them both. These facts have been made the basis for the use of a pseudotuberculosis vaccine as a plague prophylactic in Madagascar with apparently good results in the villages where it was used as compared with surrounding villages.

W F Harvey

ZLATOGOROV (S.) & MOGILEVSKAYA (B.) [On Composition of Cultures of *B. pseudotuberculosis rodentium* their Variation and Affinity with *B. pestis*.]—*Rev. Microbiol. et Epidemiol.* 1928. Vol. 7 No. 3 pp 264-279 With 8 text figs. [19 refs.] [In Russian. English summary p. 338].

Cultures of *Past. pseudotuberculosis rodentium* dissociate into smooth and rough colony forms with all degrees of transition between them. The smooth colonies show affinities which are very close to those of *Past. pestis* and are distinguished from the rough type morphologically, biochemically and biologically. These smooth culture organisms are highly virulent. The rough types are much less virulent and present the characters of *Past. pseudotuberculosis rodentium*. These facts will necessitate a reconstruction of ideas on the epidemiology of plague, plague vaccination and the destruction of rodents in plague areas.

W F Harvey

ZLATOGOROFF (S. I.) & MOGILEWSKAJA (B. I.) Constitution des cultures du *B. pseudotuberculosis rodentium* leur variabilité et leur parenté avec le *B. pestis*. [Cultures of *B. pseudotuberculosis rodentium* their Variability and Relation to *Past. pestis*.]—*Ann. Inst. Pasteur* 1928. Dec. Vol. 42. No. 12. pp 1615-1634 With 4 text figs. [19 refs.] [Sanit. Bact. Inst., Kharkov].

Differentiation of cultures of *Past. pseudotuberculosis rodentium* from those of *Past. pestis* has always occasioned difficulty. It is the characters of rough and smooth colonies of the pseudotuberculosis organism which are here studied. All transitions between the extreme types of colony were found and the diversity of forms seemed to depend on the quantity of peptone contained in the medium. Different brands of peptone gave different results. With Merck's peptone they were almost all smooth in type and with Witte's almost all rough. The organisms of smooth colonies are short and show bipolar staining while those of rough colonies are longer and large. OTTENS' experiments for the differentiation of pseudotuberculosis and plague were applied to rough and smooth colonies of the former. In a 0.5 per cent. peptone water containing 0.05 per cent. glucose the pseudotuberculosis organism should, in 3 to 7 days, produce increase of pH of the culture while plague should lower it. The same order of changes were found with rough and smooth pseudotuberculosis cultures and the smooth types were those which resembled plague cultures. In virulence again, the smooth colonies, like plague have the greater virulence. Complement fixation experiments showed that the receptor constitution of these two types of colony exhibits well marked differentiation. All these facts point to a close relationship amounting, indeed, to identity between smooth colonies of *Past. pseudotuberculosis rodentium* and *Past. pestis*.

W F Harvey

LENSKAYA (G) [On the Question of Morphological Variety of *B. pseudotuberculosis* rod. Pfeiffer and *B. pestis*]—*Rev. Microbiol. et Epidemiol.* 1928 Vol. 7 No. 3 pp. 254-263 With 20 text figs. 9 refs. [In Russian. English summary pp. 337-338.] [State Inst. of Microbiol. & Epidemiol. for S. E. of U.S.S.R.]

Three strains of *Past. pseudotuberculosis rodentium* and one strain of *Past. pestis* showed atypical forms in smears. These were coarse thick twining unevenly stained filaments and frequently appeared to branch. With subculture the plague strain and two of the pseudotuberculosis strains reverted to typical forms. The strain of pseudotuberculosis which did not revert maintained its character even after subpassage in the guinea pig. The atypical forms were obtained both from atypical and almost typical colonies on agar. These colonies were coarse pleated, alveolar net like etc. but never smooth and corresponded to HADLEY'S R type.

W. F. Harvey

i. SEMIKOV (F) & LOKHOV (M) [The Effect of Gas "Hors" over *Suslik* and the Entomo-Fauna of their Burrows.]—*Rev. Microbiol. Epidemiol. et Parasit.* 1929 Vol. 8 No. 1 pp. 54-62. [In Russian. English summary pp. 117-118.]

ii. — [The Use of Chloropicrin for Determination of Habitation of a *Suslik* Burrow and for the Catching of *Susliks*.]—*Ibid.* pp. 79-80 [In Russian. English summary p. 119.]

1. The authors state that as the result of some slight experience they consider this method unsatisfactory for the determination of habitable *suslik* burrows. Out of 27 burrows determined as occupied 12 contained fresh nests and only one *suslik*. If the burrow has been properly stopped one capsule of the gas burning for one minute will destroy *susliks* in 30 minutes. The insect fauna of the burrows is not in the least affected by the gas even after 24 hours.

a. The author proposes to use chloropicrin as a anhydrous gas when catching *susliks* cotton wool moistened with 1-2 drops of chloropicrin being placed in the burrow. A trap is placed at the outlet of the burrow and a number of *susliks* can be quickly collected so as to determine the population of a definite area.

J. H. T. W.

i. SKORODOUMOFF [La peste spontanée des spermophiles (*Spermophilus dauricus*) en Transbaïkalie] [Plague in *Spermophiles* in Transbaikalia.]—*Hygiène et Epidemiol.* Moscow 1928 No. 2. [Summarized in *Bull. Office Internat. d'Hyg. Publique* 1929 Feb. Vol. 21 No. 2. pp. 310-311.]

ii. — [Les gerboises porteurs de peste en Transbaïkalie] [*Gerbilles as Carriers of Plague.*]—*Hygiène et Epidemiol.* Moscow 1928 No. 5 [Summarized in *Bull. Office Internat. d'Hyg. Publique* 1929 Feb. Vol. 21 No. 2 p. 311.]

1. In Transbaikalia there are two different species of spermophiles *S. eversmanni* and *S. dauricus*. It was among the latter that the author found spontaneous plague. The animal is 22 cm. long and resembles

the tarabagan. It lives in burrows, easy to distinguish by their aspect and by the excrement at the entrance. The flea found on this spermophile is *Ceratophyllus tesquorum*. These spermophiles are not hunted for their fur but their proximity to human habitations is a source of danger.

II. Plague was found among gerbilles *Alactaga mongolica*. These were taken in inhabited regions and this fact calls for preventive measures.

J. H. T. W.

MOLODTSZOV (P) [Atypical Forms of the Colonies of *B. pestis*.]—*Russ. Microbiol. et Epidemiol.* 1928. Vol. 7. No. 3. pp. 283-288. With 9 text figs. [1 ref.] [In Russian. English summary p. 330. (State Inst. of Microbiol. & Epidemiol. for S. E. of U.S.S.R.)]

These atypical forms were virulent for the guinea pig. The same forms were isolated from urine, intestines and bile, while typical forms were found in other organs.

W. F. Harvey

FUSCO (L.) Appunti pratici sulla diagnosi della peste nel moriale.—*Rivista medico Med. Giorn. Ital. di Malat. Esotiche Tropicali*. N. plen. 1928. J. iv 15-Aug. 15. N. 4-5. 8 pp.

GRAHAM (J. D.) TRAVAIL de l'Institut Haffkine à Bombay sur la peste.—*Bull. Office Internat. d'Hyg. Publique* 1928. Oct. Vol. 20. No. 10. pp. 1600-1617.

GREKOV (A. D.) [Der Pestausbruch im Narynischen Kanton der Kyrgysenrepublik im September 1928].—*Pravda Med. d'Usbekistana*. Tashkent. 1928. No. 3. pp. 40-46. [In Russian. German summary pp. 100-101.]

JAPAN MEDICAL WORLD 1928. Oct. 15. Vol. 8. No. 10. pp. 206-208.—Plague Epidemic in Inner Mongolia. Reported by the S.M.R. Sanitary Office Dairen.

JOURNAL OF ORIENTAL MEDICINE. 1928. Nov. Vol. 9. No. 5. With 1 fig. [In] persian. English summary pp. 67-70.] Plague Epidemic in Inner Mongolia.

V. LINDEN (A. A.) Observations on a Series of Cases of Plague.—*J. Nat. Assoc. South Africa*. 1928. Dec. 8. Vol. 2. No. 23. pp. 631-634.

PARRERAS (DECHO) Sobre um surto de peste em Neves, no Município de São Gonçalo Estado do Rio de Janeiro.—*Archivos de Hyg. Rio de Janeiro* 1928. May. Vol. 2. No. 1. pp. 129-150. With 4 figs. & 2 maps on 4 plates. English summary facing p. 150.

RAGAZZI (C. A.) Le vie della peste in Cirenaica. Studio sommario del periodo epidemico 1913-1922 dei pretesi focolai endemici del Barka.—*Arch. Ital. Sci. Med. Colon.* 1928. Dec. Vol. 9. N. 12. pp. 709-734. [11 refs.] [Inst. of Colonial Path. Univ. Bologna.]

ROGOZA (P.) Un cas d' peste pulmonaire primitive survenu à Tashkent.—*Bull. Soc. Path. Exot.* 1928. Dec. 15. Vol. 21. N. 10. pp. 676-678.

TSURUMI (MITSUO) Sur la petite épidémie de peste pneumonique de 1927 en Mongolie.—*Bull. Office Internat. d'Hyg. Publique*. 1928. Oct. Vol. 20. No. 10. pp. 1602-1603.

YELLOW FEVER.

LASNET Relation de l'épidémie de fièvre jaune au Sénégal en 1927
[The Yellow Fever Epidemic in Senegal in 1927]—*Bull Office
Internat d'Hyg Publique* 1929 Jan. Vol. 21 No 1 pp
54-98. With 1 map in text. [6 refs]

A valuable summary of observations on this epidemic dealing first with its outbreak, the clinical features the importance of prophylactic diagnosis with the necessity of considering all doubtful cases of fever as suspect and taking appropriate measures to prevent any chance of mosquitoes feeding on them. No satisfactory method of treatment was found although many were tried. Various methods of vaccination were used and about 500 persons received inoculations of Noguchi's vaccine. 6 of these subsequently became infected with yellow fever and 4 died. In addition various other vaccines were used including Quinby, a preparation of quinine and bismuth but their action was very doubtful.

The epidemiology of the outbreak is considered in detail. The susceptibility of Syrians Portuguese half breeds and Moroccans is well known, and attention is called to the difficulty of their supervision for they generally live in the same way as the natives and often conceal cases of disease until the patient is at the point of death. Although in certain localities the Syrians were the only class of the foreign population showing cases of yellow fever suggesting that they had acquired the infection from the natives yet careful inquiries showed that these Syrians travelled extensively by motors and had frequently visited infected neighbourhoods, often at night. The Syrians by their indifference to hygiene their poverty and also their mobility, are considered to be of great danger in the spread of yellow fever and it is very necessary that they should be closely supervised.

After referring to recent laboratory work on the disease the author describes the administrative measures adopted in order to control the epidemic. The difficulties of the campaign against yellow fever in West Africa and lessons to be drawn from this epidemic are discussed in the latter part of the article. In common with many other diseases ignorance or apathy is one of the most important factors favouring the spread of epidemics, for the great majority of the cases occurred in persons who had neglected to take precautions against being bitten by mosquitoes. The report should be read in its entirety by those interested in the subject.

E. Hindle.

CAZANOVE (F) Notes épidémiologiques sur l'épidémie de fièvre jaune du Sénégal en 1927 [Epidemiological Notes on the Yellow Fever Epidemic in Senegal in 1927]—*Bull Soc Path Exot* 1929 Apr 10 Vol. 22. No 4 pp 260-272.

An interesting historical account of yellow fever in Senegal during the past century for details of which the original article should be consulted. The earlier epidemics all started at Gorée which was formerly the chief port of the Colony and a number of the outbreaks are attributed to the importation of cases from the Gambia. The severity of some of these epidemics is indicated by the official statistics. In 1830

at Gorée, out of 152 Europeans there were 144 yellow fever cases with 52 deaths, and at St. Louis, out of 650 Europeans, 520 deaths. In 1859 at Gorée, out of 267 Europeans, 244 cases and 162 deaths. In 1878 in Senegal generally out of 1 474 Europeans 749 died of yellow fever including 22 out of 26 doctors.

It is pointed out that in Senegal the cool breezes of November diminish the activity of *Stegomyia*, and therefore if any yellow fever cases occur towards the end of the year the outbreak can generally be suppressed with the aid of the natural conditions without resorting to extreme measures. When, however any cases occur in May June or July the rapid multiplication of mosquitoes in these and the following months, renders it necessary to use every possible means of controlling the outbreak, including the most stringent quarantine regulations.

Previous to 1878 the epidemics of yellow fever are considered to have originated from cases brought by ships mainly from the Gambia. From 1878 to 1900 the disease was probably spread by the large number of natives recruited during the economic development of the country. From 1911 to 1927 the cases seem to be spread mainly along the railways, by the movements of natives from the neighbouring regions of Saloum and the Gambia.

Finally the author advocates that the endemic regions of yellow fever should be delimited. This would necessitate the use of *Mecurus rhinos* and it is suggested that a laboratory might be formed on Cap-Vert Island, where the experimental work could be performed without danger to the Colony. When the endemic zones have been discovered it would be possible to concentrate prophylactic measures, as it is obviously impracticable at present to eliminate *Stegomyia* from the whole of West Africa.

E. H.

LASNET. La fièvre jaune en Afrique Occidentale Française en 1928. [Yellow Fever in French West Africa in 1928.]—*Bull. Offici. Internat. d'Hyg. Publique* 1929 Jan. Vol. 21 No 1 pp. 49-51.

A record of 8 cases among Europeans 3 in Dahomey of which 1 fatal, and 3 in the Ivory Coast, all fatal. Details are given of the epidemiology of two cases at Abidjan, and strong evidence is brought forward in support of the view that the second case showed the unusually long incubation period of 10 days and 10 hours, after [presumably] being infected by the bite of an infected mosquito.

E. H.

SELWYN-CLARKE (P. S.) The Outbreak of Yellow Fever in Accra March-June, 1927.—*Gold Coast Rep. on Med. & San. Dept. for Year Apr. 1927 to Mar. 1928* Appendix G. Sessional Paper XXVII. 1927-28. pp. 121-140. With 2 maps & 1 chart.

An interesting account of the outbreak of yellow fever in Accra in 1927 giving the history of previous epidemics as well as the present one. The inadequacy of present methods of recognizing the disease, especially in natives is well exemplified in the present report, for at Asamankese less than 50 miles from Accra, a serious epidemic of

yellow fever raged for more than two months in 1926 apparently without having been recognized, and the Rockefeller Commission estimate that during this period there were more than 1 000 cases and over a hundred deaths. Other cases were recorded from other towns in the neighbourhood, so that sources of infection for Accra were not lacking. A table is given of the number of cases of yellow fever in Europeans, Africans and Syrians respectively each year during the last 18 years, and it is noteworthy that even with these obviously incomplete records [e.g. the above-mentioned Asamankese epidemic is not included] the disease has never been absent from the colony during the whole of this period. The 1927 epidemic in the colony affected the African population rather more than the European for there were 88 cases with 25 deaths in the former and 14 cases with 10 deaths in the latter. In addition there were 5 cases in Syrians with 5 deaths. Details are given of the history of 16 cases in Accra, and although the figures are too few to allow of definite conclusions being drawn there is some evidence of the existence of mild unrecognized attacks in non-immunes which confer some degree of protection. Only one of the fatal cases occurred in a person who had spent more than two tours in West Africa and of the Africans only two cases occurred in the local Ga tribe comprising the majority of the population, whilst five cases were amongst immigrants from other parts.

It is suggested that the prevalence of yellow fever in coast towns in the Gold Coast for centuries has resulted in the development of some degree of local racial immunity for the disease certainly runs a milder course among the indigenous population. With reference to the possibility of unrecognized cases in children it is a curious fact that the percentage of infant deaths to the total deaths of all ages has remained almost constant (19 to 25 per cent.) during the past seven years, in spite of infant welfare schemes and improvement in sanitary conditions and education. Finally an account is given of the administrative provisions and preventive measures of value in combating the outbreak.

E H

BUCHANAN (George S). La fièvre jaune dans l'Afrique Occidentale Britannique. [Yellow Fever in British West Africa.]—*Bull Office Internat d'Hyg Publique* 1929 Jan. Vol. 21 No 1 pp 52-53 [1 ref]

The exact way in which NOGUCHI and YOUNG accidentally contracted yellow fever at Accra, Gold Coast is not clear but the author shows that the available evidence indicates the extreme likelihood of infection having been contracted in the laboratory. After Dr Young's death it was decided to close the yellow fever laboratory at Accra, and all infected material and animals were destroyed.

Reference is made to HINDLE'S work [*ante* p 292] and also to the fact that 1 000 cc. of his vaccine had been sent to the Belgian Congo. Mention is also made of the special laboratory accommodation required in Great Britain by the Ministry of Health in order to avoid any risk to the general population from infected mosquitoes used in his experiments.

E H.

- PAXI (M.) Sur la fièvre jaune au Mexique [On Yellow Fever in Mexico.]—*Bull. Office Internat. d'Hyg. Publique* 1929 Jan. Vol. 21, No 1 pp 99-100 [1 ref.]

Owing to the introduction of energetic anti-mosquito measures especially the use of larvicides, yellow fever seems to have disappeared from Mexico no case having been recorded since August, 1922.

E. H.

- CAZANOVE (F.) La fièvre jaune des enfants [Yellow Fever in Children.]—*Bull. Soc. Path. Exot* 1929 Mar 13 Vol. 22, No 3 pp. 184-191

The author gives details of the clinical symptoms of eight yellow fever cases some fatal, in children at Dakar ranging from 3 up to 14 years of age. These are of considerable interest as they show all grades from very mild cases, hardly recognizable as yellow fever up to severe fatal ones. Albuminuria was constantly present. In the discussion following the paper both Dr Marcel LEGER and MARCHOUX consider that the natives at Dakar must have become adapted to the yellow fever virus before the epidemic of 1927. These authors are also of the opinion, as noted by MARCHOUX in Brazil, that children are distinctly less susceptible than adults to infection with yellow fever.

E. H.

- KADANER (M.) Observations de quelques cas de fièvre jaune à Boma. [Observations on Cases of Yellow Fever at Boma.]—*Ann. Soc. Belges de Méd. Trop.* 1928. Dec. Vol. 8. No 3. pp. 297-303

A description of three cases of yellow fever occurring at Boma, Belgian Congo at the end of 1927. In each case severe vomiting set in by the third day and albuminuria on the second day.

E. H.

- GOLD COAST REPORT ON THE MEDICAL AND SANITARY DEPARTMENT FOR THE YEAR APRIL, 1927 TO MARCH, 1928. Appendix C. pp 104-108. —[Case of Yellow Fever.]

A detailed clinical account of a fatal case of yellow fever in a German at Accra, who had received an injection of Noguchi's vaccine four months previously. Blood collected on the third day of fever was inoculated into a rhesus monkey which became infected and this strain, known as the "P-" strain, has been kept going in monkeys both by direct inoculation of blood and by means of mosquitoes in the Lagos Laboratory of the Rockefeller Yellow Fever Commission.

E. H.

- DA CUNHA (Aristides Marques) & MUIX (Júlio) Note sur la fièvre jaune expérimentale. [Note on Experimental Yellow Fever.]—*C. R. Soc. Biol.* 1929 Apr 8. Vol. 100. No 11 pp 963-965

A continuation of the authors previous note on this subject [*exts* p. 303]. The Brazilian virus isolated by them does not always cause the death of inoculated monkeys, and it is often difficult to decide whether the animals are infected or not. Thus one monkey bitten by infected mosquitoes showed a rise in temperature followed by hypothermy and death on the fourth day but on autopsy only pneumonic lesions could

be found. The African virus used by the authors invariably caused death within 4 to 6 days and the degeneration of the liver was almost always very extensive, even though very small doses were used for inoculation. The difference between the African and Brazilian virus seems to be only a question of virulence. Two monkeys infected with the African virus were killed on the 3rd and 4th days respectively and both showed distinct necrosis in the liver, with oxychromatic degeneration more pronounced in the second individual. The early appearance of these lesions shows that the absence of these hepatic changes as in some of the monkeys inoculated with the Brazilian virus, is not because a certain phase of the disease has not been reached but that the appearance of the symptom depends on the virulence of the virus, which is evidently variable.

E. H

SELLARDS (A. W.) & MATHIS (C.) *Expériences de transmission du virus amaril au Macacus rhesus* [Observations on Transmission of Yellow Fever to *Macacus rhesus*]—Reprinted from *Conférence Africaine de la Fièvre Jaune* 12 pp [4 refs.] 1928. Paris

A summary of observations made at Dakar during the 1927 epidemic. Entirely negative results were obtained by the inoculation of the blood and urine of seven yellow fever patients into 19 guineapigs. Attempts were made to transmit the disease to *Macacus rhesus* by the inoculation of blood of yellow fever cases also by the inoculation of organ emulsions or tissues obtained at autopsies and finally by the bites of infected mosquitoes. The results indicate that in order to succeed it is necessary to get patients in the early stages of the disease for blood collected from yellow fever cases on the 3rd to the 7th days and also all post mortem material failed to infect monkeys.

The only successes obtained were by the inoculation of blood collected 20 hours after the beginning of fever and the bites of mosquitoes also fed at this early stage.

In the discussion Dr LASNET stated that NOGUCHI found that infected blood preserved its virulence for several weeks even without being kept in the ice chest. Dr BEEUWKE found that citrated blood kept its virulence for 22 days at room temperature.

With reference to Dr ADRIAN STOKES's infection, his blood was collected 12, 36 and 84 hours respectively after the beginning of the infection and inoculated into *M. rhesus* which all died of yellow fever. Mosquitoes fed 12 hours after the onset of the disease became infected, but those fed after an interval of 36 hours remained uninfected.

E H

HUDSON (N. Paul) BAUER (Johannes H.) & PHILIP (Cornelius B.) *Protection Tests with Serum of Persons recovered from Yellow Fever in the Western Hemisphere and West Africa.*—*Amer J Trop Med* 1929 Jan Vol 9 No 1 pp 1-16 [4 refs.]

Rhesus monkeys were inoculated with yellow fever virus and doses of convalescent serum from respectively West African and South American cases of the disease. The amount of serum used varied

from 2.0 cc. to 0.1 cc., and in one experiment was inoculated at the same time as the virus, but in the two other experiments the serum was inoculated intraperitoneally one hour previous to a subcutaneous inoculation of the virus. The results show that serum from four individuals out of 11 tested, all of whom had recovered from yellow fever in South America, and seven samples of West African serum, protected monkeys against a lethal dose of a West African strain of yellow fever.

[These results confirm the now generally accepted view that the strains of yellow fever in West Africa and South America are essentially the same. *Ibid.* p. 306]

E. H.

TORRES (C. Magarinos) *Intranuclear Inclusions in Experimental Yellow Fever.*—*Inst. Oswaldo Cruz Supplemento das Memorias.* 1929 Mar No. 6 pp. 69-71. With 6 figs. on 3 plates & 1 coloured plate [5 refs.]

A further account of these inclusions which were found in 31 out of 43 *Macacus rhesus* infected with Brazilian and African strains of yellow fever whilst they were not seen in 6 normal monkeys as well as nine others injected with miscellaneous material. The appearance of these bodies has been previously described [*ante* p. 301], but in the present article the author records differences between these structures in monkeys inoculated with the Brazilian and African virus respectively.

In the African series the acidophile intranuclear material is often subdivided into minute granules; this appearance is not common in the Brazilian series, in which fragmentation of the intranuclear material is never so marked, and any granules present are less numerous and generally larger. Moreover in the liver cells of monkeys infected with the Brazilian virus the butterfly-like intranuclear figures are very common whilst such figures were not found in the African series. In the latter the amount of basichromatin forming thick rods on the nuclear membrane is apparently larger than in the Brazilian series. It is suggested that in the African series there is a predominance of later stages of oxychromatic degeneration and in the Brazilian a predominance of early stages. The differences in virulence and adaptation resulting in slight necrosis of liver cells (Brazilian) or marked necrosis (African) may account for these discrepancies.

E. H.

TORRES (C. Magarinos) *Etude, par le procédé de Goodpasture et la réaction de Feulgen, des inclusions nucléaires, de la fièvre jaune expérimentale.* [A Study of Nuclear Inclusions in Experimental Yellow Fever Employing Goodpasture's Method and Feulgen's Reaction.]—*C. R. Soc. Biol.* 1929 Apr. 8. Vol. 100 No. 11 p. 908. [2 refs.]

Liver cells from monkeys infected with yellow fever were stained by Goodpasture's method, and the intranuclear bodies which coloured bluish-violet clearly differentiated from the red staining nucleoli. These intranuclear bodies seem to be the result of coagulation or precipitation of the nucleoplasm. When tissues were stained by

Feulgen's method these bodies were found to remain uncoloured thus showing the absence of thymonucleinic acid and proving that the intranuclear inclusions in yellow fever have a different composition from chromatin

E. H

LEITE (A Lobo) Etudes hématologiques dans la fièvre jaune
[Haematological Studies in Yellow Fever]—*C R Soc Biol*
1929 Apr 8 Vol. 100 No 11 pp 946-948 [Oswaldo
Cruz Inst Rio de Janeiro]

These studies in the main confirm previous observations on this subject. The leucopenia is difficult to explain whether the result of excessive destruction or of exhaustion of the bone marrow. Many leucocytes contain fat which may be either the result of degeneration or have been ingested. The hyperglobuly is a result of a diminution in haemolysis which leaves in the circulation a large number of old red cells. The jaundice is extra hepatic and finally the haemorrhagic syndrome may be interpreted as an attempt on the part of the body to defend itself against the changes, in particular the accumulation of old red cells which have lost their power of transporting oxygen.

E. H

PICHAU (Jean) Note sur l'urine de sujets atteints de fièvre jaune
[The Urine in Yellow Fever Patients.]—*Bull Acad Méd* 1929
Mar 27 Year 93 3rd Ser Vol. 101 No 12. pp 445-447
[8 refs.]

The results of the examination of 2 000 specimens of urine during the yellow fever epidemic in Dakar 1927 and also in Dahomey 1924 indicate that urine analysis furnishes a useful aid to the diagnosis of this disease. During the epidemic at Dakar the urine of yellow fever cases was examined twice daily and the results are as follows —

During the first two days the urine is clear and abundant but loses its chlorine very rapidly. The quantities of urea and urobilin are normal and there is no trace of bile or blood pigments. In typical cases albumin appears towards the end of the second day and rapidly increases in amount from 1 to 10 gm. or even more each day. From the fourth day generally correlated with the appearance of black vomit peptones appear in the urine and increase up to death. This increase in the amount of peptones is an almost certain sign of a fatal termination and is of value in prognosis. The urine does not contain sugar blood haemoglobin no excess of urobilin, and only rarely traces of bile pigments. It is readily distinguished from the urine in other diseases. The appearance of bile pigments in quantity on the fifth day is an almost certain indication of recovery. They persist for about ten or twenty days the peptones disappear almost at once. The albumin persists for three or four days then falls and disappears unless a relapse occurs. The chlorides increase very slowly and the normal composition of the urine does not become re-established until about a month after the attack. In some atypical cases the amount of albumin rose to 8 to 10 gm. per litre in patients showing neither cardiac nor renal trouble nor any digestive symptoms and in these

cases bile pigments appeared during the convalescence. Three cases with meningitic symptoms showed no change in the quantity of albumin, and the bile pigments and chlorides never appeared in the urine, or only in minute quantities.

E. H.

LEGENDRE (J.) La fièvre jaune peut-elle s'étendre à tous les pays à *Stegomyia*? [Can Yellow Fever spread into all *Stegomyia* Countries?]—*Presse Méd* 1929 Apr 6. Vol. 37 No. 28. pp. 459-460 With 1 map in text. [1 ref.]

An article maintaining the author's previous view that there are two races of *Aedes aegypti*: a large one capable of transmitting yellow fever and a small Oceanic and Indian species incapable of transmitting the disease.

[These two so-called races have been shown to be identical by cross-breeding experiments (see HOFFMANN BRUG, this *Bulletin*, Vol. 25 p. 549). Moreover HINDLE (*ante* p. 292) has shown that yellow fever may easily be transmitted from monkey to monkey by the bites of an Indian strain of *Aedes aegypti*.]

E. H.

BARRATO (João de Barros) & PERTASSO (Antonio Goncalves). Da aspersão de insecticidas na prophylaxia da febre amarela. [Sprinkling of Insecticides in Prevention of Yellow Fever.]—*Brasil-Médico* 1929 Mar 30 Vol. 43. No 13 pp. 350-359.

Many experiments were carried out to determine the best method of destroying adult *Aedes* in buildings. A table is given showing the preparation used and the quantity per cubic metre, the size of the rooms and whether all crevices were sealed or not, the number of mosquitoes introduced and the results. Sixty-two experiments were performed and the chief substances used were "Flit," a Standard Oil preparation "Stegol," a mixture of pyrethrum, xylol, cresol and methyl salicylate in paraffin, carbon tetrachloride 7 per cent. with methyl salicylate 3 per cent. [Where conditions are so varied little valid inference can be drawn from the results. Thus 10 cc. of Stegol was insufficient to kill the mosquitoes in one room of 170 c. metres, but 12 cc. proved quite effectual in another room of 548c. metres.]

H. Harold Scott.

ARAÚJO (Henrique de Beaurepaire). Yellow Fever Virus. Transmission of Brazilian Strains to *Macacus rhesus* and *Macacus cynomolgus*. Preliminary Report.—*Jl Amer Med Assoc* 1929 Feb. 18. Vol. 92 No 7 pp 550-551 With 2 charts in text. [2 refs.] [Oswaldo Cruz Inst. Rio de Janeiro.]

See this *Bulletin* Vol. 28, pp. 303-306

E. H.

TORRES (C. Magarinos). Inclusões nucleares na febre amarela.—*Brasil-Médico* 1929 Apr 6. Vol. 43 No 14 p. 360 [Oswaldo Cruz Inst. Rio de Janeiro.]

2ICROUL (I N) [Fièvre récurrente à tiques d'Asie Centrale et son agent pathogène] [Tick Fever in Central Asia and its Pathogenic Agent.]—*Russian Jl Trop Med* 1928 Vol. 6 No 10 pp 612-618 With 2 figs on 1 plate [10 refs] [In Russian. French summary p 618.] [Trop Inst. Moscow & Trop Inst. Usbekistan.]

An epidemic of relapsing fever transmitted by the local species of *Ornithodorus* has been observed by the author at Fergan in Bukhara. The author has transmitted the infection to human patients rats mice and guineapigs by the bites of this tick, and also by percutaneous or subcutaneous inoculation of infected blood. The spirochaetes are rare in the blood of man, and also in rats and mice but in guineapigs the organisms are very numerous and cause a mortality of about 40 per cent. The spirochaete is morphologically identical with *S. recurrentis* and *S. duttoni* but the results of cross-immunity experiments indicate its distinctness from these races and therefore the author proposes a new name *Spirochaeta usbekistanica* for the pathogenic agent of human tick fever of Central Asia

E. Hindle

DOUBROWINE (V Ph.) [Sur la question de typhus recurrens dans le département de Samarquand.] [Relapsing Fever in the Province of Samarkand.]—*Pensée Méd d'Usbekistan* Tashkent 1928. Nov No. 2 pp 23-31 With 6 charts in text. [6 refs] [In Russian. French summary p 97]

In this province relapsing fever is endemic and 36 cases were observed in the military hospital in 1924 1925 and 1926 The disease although mild was occasionally complicated by iridocyclitis. Neosalvarsan was found to have no effect on the febrile attacks but might prolong the apyrexial intervals

E. H.

LOZANO (Pedro) & PEÑA (Marcelino) Los primeros casos de fiebre recurrente en Avila. [Relapsing Fever in Avila, Spain.]—*Medicina Paises Cálidos* Madrid. 1928 Nov Vol. 1 No 6 pp 543-545

Cases of the Spanish type of relapsing fever have been met with in Toledo Cáceres, Badajoz Córdoba, Huelva, and Sevilla. Two cases are now recorded in Avila both quite mild, which, but for enlargement of lymphatic glands to the size of a chickpea to a hazelnut painless and non-adherent and the absence of rigors would probably have been regarded as malarial.

H Harold Scott

- i. HORRUS (Pierre) Note au sujet de la fièvre récurrente marocaine. [Moroccan Relapsing Fever]—*Arch Inst Pasteur de Tunis* 1928. Dec. Vol. 17 No 4 pp 327-331 With 1 chart in text.
- ii. NICOLLE (Charles) & ANDERSON (Charles) Réflexions à propos du mémoire de P. HORRUS sur la fièvre récurrente marocaine—*Ibid.* 332-334 [1 ref.]

i. It may be recalled that DE BUEN [see this *Bulletin* Vol. 23 p. 590] thought that Moroccan relapsing fever was associated with the presence of pigs. The author (P. HORRUS) has observed various cases of the disease in which this possibility was excluded. The Moroccan relapsing fever seems to attack Europeans in preference to Africans, and especially during the spring and autumn. The parasite transmitting the infection has not been discovered, but it seems to be present in the soil or in the walls of houses and to retain its infectivity for considerable periods.

This type of relapsing fever can be inoculated into guineapigs in which it produces a series of relapses resembling those in man, and lasting from 18 to 25 days. The strain can be maintained in guineapigs.

ii. Nicolle and Anderson make some observations and suggestions based on the preceding article and are in complete agreement with the view that the presence of the disease is not correlated with keeping pigs. They incline to the view that rodents will be found to be the natural host of the spirochaete.

E. H.

ARCHIVES DE L'INSTITUT PASTEUR DE TUNIS 1929 Mar Vol. 18 No. 1 pp 84-85 [3 refs.] A propos de l'article Fièvre à tiques marocaine du médecin capitaine CHAUBET [Concerning Chaubet's Article, Moroccan Tick Fever.]

A note calling attention to three cases of relapsing fever recorded by Captain Chaubet from Morocco in which the patients became infected after having been bitten by ticks at Bou Enadel.

E. H.

LEMBOK. Notes sur trois cas de fièvre récurrente observés à Usumbura (Urundi) [Notes on Three Cases of Relapsing Fever observed at Usumbura (Urundi)]—*Ann Soc Belge de Méd Trop* 1929. Mar 31 Vol. 9 No 1 pp 45-57 With 3 charts in text.

The author has observed and treated numerous cases of this disease in both natives and Europeans, in the latter of whom it is much more severe and details are given of three patients illustrating the different course of the disease in Europeans. In addition the author gives a summary of his experience of treatment. The action of Novar or "914" during the first attack is very variable in at least a third of the cases it does not influence its duration more often, it shortens its duration and occasionally suppresses the attack. Large doses (0.6 to 0.75 gm.) have no better effect than smaller ones of 0.3 to 0.45 gm. Subcutaneous or intramuscular injections of acetylarsan (3 cc.) had the same effect as intravenous novar. Stovarsol by mouth (1.50 gm.)

seemed to be as efficacious as injections of the other compounds but the author's experience is limited. The inoculation of a second but smaller dose of novar (0.15 gm.) or acetylarsan (2 cc.) the day after the first injection seems to hasten the termination of the attack. The systematic use of repeated injections was found to be useless and is condemned by the author. Most cases were cured by one large and one small dose and no further treatment was required except in the case of relapses.

E H

ADCOCK (E W) *Meningismus in Relapsing Fever* [Correspondence]—*East African Med J* Lagos 1929 Jan Vol. 2. No 3 p 172.

A record of a case of relapsing fever at Kano [Nigeria] in which the patient showed symptoms of meningitis. A cerebro-spinal puncture resulted in spirochaetes being found, instead of diplococci, and the condition cleared up by crisis after an intravenous injection of 0.6 gm. novarsenobillon.

E H

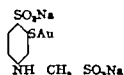
DE BUEN (Sadi) *Nota preliminar sobre el tratamiento de la fiebre recurrente española*. [The Treatment of Spanish Relapsing Fever]—*Medicina Países Calidos* Madrid. 1928 Nov Vol. 1 No 6 pp 539-542. [1 ref.]

Eight patients infected with Spanish relapsing fever were treated with 0.3 gm. salvarsan or allied compounds intravenously and only two relapsed. Three were given stovarsol, 1 gm. daily by mouth and two relapsed. Five had 1 gm. daily of spirocid [the formula of which is identical with that of stovarsol] and two relapsed.

E H

STEINER (G) & FISCHL (Viktor) *Experimentelle Untersuchungen zur Pathologie und Therapie der Spirochätenkrankheiten. Ueber die Wirkung von Goldpräparaten bei experimenteller Recurrens*. [An Experimental Study of the Pathology and Treatment of Spirochaetosis. The Action of Gold Compounds on Experimental Relapsing Fever]—*Klin Woch* 1929 Mar 26 Vol. 8 No 13 pp 582-585 [17 refs.] [Psychiat Neurolog Clinic, Univ Heidelberg]

The authors have tested the action of two gold compounds Solganal and A 69 on rats and mice infected with a strain of *S. duttoni*. Solganal has the following composition —



and contains 36.5 per cent of gold. A 69 is a similar preparation adapted for intramuscular injection. Both compounds were found to have a

much higher chemotherapeutic index than neosalvarsan, as indicated by the results of comparative tests. In addition residual infections of

Strain	Compound	Injection.	Dose per 20 gm mouse in gms.		Re-lapse after	Therapeutic Index
			Dosis tolerata	Dosis curativa		
<i>S. recurrentis</i>	Neosalvarsan	Intravenous	1/135	1/400	6 days	1.3
<i>S. duttoni</i>	Solganal	Intraperitoneal Intramuscular	1/100	1/1000	?	1.10
	Solganal		1/100	1/2000	6 days	1.20
	A 60		1/70	1/1250	6 days	1.10

the central nervous system were entirely eliminated by these two gold preparations, whilst salvarsan and its derivatives have no action on such residual infections. Particulars are given of the successful treatment of experimental relapsing fever in a parietic patient by means of repeated intravenous injections of solganal, in which after the second injection the blood became negative as tested by subinoculations into mice, and the cerebro-spinal fluid was negative when tested after 19 days.

When administered as a prophylactic it was found to check the development of infection. Four mice were each given two injections of solganal with an interval of 6 days, and 1 day later inoculated with spirochaetes. Control animals inoculated at the same time died of the infection within 4 days, whilst the others were negative until the seventh day when two showed spirochaetes and the other two succumbed to an intercurrent disease.

E. H.

SAGEL (Wilhelm) Eigene Beobachtungen ueber den ungestörten und den durch chemotherapeutische Massnahmen beeinflussten Infektionsverlauf, ueber das Verhalten der Immunität, das leukocytaire Blutbild und klinische Erfolge bei mit verschiedenen Recurrenzstämmen künstlich infizierten Paralytikern. (Observations on Immunity the Leucocyte Formula, and Clinical Effects of Various Strains of Relapsing Fever used in Cases of Paralysis).—*Beihfte z Arch f Schiffs- u Trop Hyg* 1928. Vol. 32. No. 6. pp 283-322. [44 pp.] With 34 charts in text [1 ref.]

A detailed study of treated and untreated attacks of relapsing fever based on observations of cases of paralysis experimentally infected with this disease. Five strains of relapsing fever were used, *S. duttoni*, Moroccan, Spanish and Angola strains, all of which had been maintained in white mice and another strain of *S. duttoni* in ticks. Advantage has been taken of the opportunity of making detailed studies of experimental infections with these strains and in addition the results indicate that relapsing fever is a very efficient substitute for malaria in the treatment of cases of paralysis.

The Moroccan (*S. barberti*) Spanish (*S. hispanica*) and Angola strains of relapsing fever have not previously been used therapeutically but all three were found to be as efficacious as *S. duttoni*. It is necessary

however to use strains kept in white mice, for the bites of *Ornithodoros maroccanus* infected with *S. berbera* produced such very severe attacks that their therapeutic use is out of the question

Neosalvarsan and sodium benzazon were found to check infections with the three strains mentioned above but had very little effect on *S. duttoni*. When an attack of relapsing fever is checked by chemotherapeutic agents the development of antibodies against the infection is arrested at the stage already reached by the body of the host consequently varying stages of immunity will be shown by treated persons depending on the period of the disease when treatment was begun. In order to succeed in the treatment of relapsing fever the author found it necessary to administer the drug at a certain stage of the disease when a number of febrile attacks had resulted in the development of a degree of natural immunity also the temperature should be rising and spirochaetes present in the blood. Under these conditions arsenical preparations will produce an immediate effect

If these conditions are not fulfilled the remedy may have a harmful effect resulting in the spirochaetes being driven from the blood into other parts of the body often with the development of typhoid symptoms. These observations may help to explain the course of the disease in the later stages of syphilis, involving affections of the blood vessels and nervous system.

Each of the four strains used, when allowed to run its full course untreated, resulted in the development of a specific immunity only against itself and not a general immunity against other strains of relapsing fever. However this immunity seems to be only a relative one, since it is not entirely bound up with the strain used but also depends on the way in which the strain has been maintained. For example patients infected by the bites of ticks infected with *S. berbera* were not immunized against the subsequent inoculation of the blood of mice infected with this spirochaete. It would seem that far reaching biological changes are induced by changes in the environment of these spirochaetes, which may help to explain many of the discordant results of experiments on immunity (especially its duration) and allied problems. When it is seen that similar strains may become different after changes in passage, it is not unreasonable to assume that when different strains are maintained under identical conditions for long periods they may come to resemble each other as in the case of *S. duttoni* and *S. hispanica*.

It appears that with experimental relapsing fever in paralytics a true immunity is developed and not an infectious one. The relations of the course of the infection and the stage of immunity to the blood forming organs and the blood picture influenced by these changes are reflected in the different leucocyte curves. Consequently when the disease is untreated, an immunizing curve is shown by reinoculation with an homologous strain, when immunity already exists an immunity curve is obtained by successful treatment a sterilizing curve with unsuccessful treatment a displacement curve and by the inoculation of inactive substances a neutral curve.

One hundred and two cases of paralysis have been treated with the aid of relapsing fever during the past three years 42 completely recovered, 13 partly recovered and 8 showed some improvement it is evident therefore that relapsing fever especially strains susceptible to chemotherapeutic agents is a useful adjunct in the treatment of paralysis.

TALICE (R.) *Pyretoterapia con Treponema hispanicum*. [Pyreto-Therapy by Means of *Treponema hispanicum*].—*Medicina Paises Calidos*. Madrid. 1928. Nov. Vol. 1 No. 6. pp. 531-538. With 3 figs. & 4 graphs in text.

By the term Pyreto-therapy is meant the treatment of disease by a second infection with the purpose of inducing fever for instance, the treatment of general paralysis by malaria.

SACH DE BUEK in 1922 discovered a new form of relapsing fever due to *S. hispanica*, which is of a mild type and usually clears up spontaneously. The suggestion is made, therefore, to use this for the treatment of nervous affections. The natural vector is *Ornithodoros mouroi*. This method of treatment has been tried in 40 cases in Monte Video—20 cases of general paralysis, 9 of secondary syphilis, 7 of dementia praecox, and 4 epileptics. It is too early to judge of the effects in the first group but the convulsions in the epileptics ceased during the febrile periods. Clinically the others have not shown much, if any improvement, but the spinal fluid of the paralytics contains less albumin and a smaller lymphocyte count. The results are not so good as those from malarial treatment—the advantages are that the virus is easy to conserve and handle and that the disease produced is mild, well borne, cures itself spontaneously and leaves no sequelae.

H. Harold Scott.

ARMSTOWSKY (W. M.) & WAINSTEIN (A. B.) *Rekurrenz-Schutzimpfungsversuche am Menschen*. [Experiments on Protective Inoculation against Relapsing Fever in Man].—*Ztschr. f. Immunittät u. Experim. Therap* 1929 Apr. 12. Vol. 61 No. 3/4 pp. 296-308.

Working with a strain of European relapsing fever (*S. recurrens*) the authors found that the inoculation into men of spirochaetes of the original attack, killed by heating to 60° C. for half an hour was followed by the development of specific spirochaetolyins in the blood. Also such a patient was protected against a subsequent subcutaneous inoculation of a living culture of the same type of spirochaetes (i.e. of the original attack). This vaccination against the spirochaetes of the first attack ("Ausgangsrasse") gave no protection against the inoculation of spirochaetes of the relapses of the same race. The inoculation of a relapse strain resulted in the development of spirochaetolyins which did not protect against infection with the original strain, although the patient was immune against subsequent infection with the relapse strain. The inoculation of spirochaetes of the relapse strain killed by heating to 60° C. for half an hour did not result in the formation of any spirochaetolyins in the blood, either against the relapse strain or the original one.

E. H.

WAINSTEIN (A.) *Immunologische Beobachtungen beim Rekurrenz des Menschen*. I. Mitteilung. [Immunological Observations on Human Relapsing Fever].—*Ztschr. f. Immunittät u. Experim. Therap* 1929 Vol. 60 No. 3/4 pp. 142-155. With 1 chart in text. [18 refs.] [Microb. Inst., Tatar Health Commissioner, Kasan.]

The treatment of human cases of paralysis by infection with relapsing fever has enabled the author to make various observations on lysins

and the biological relationships of a race of *S. recurrentis* that had been grown on Aristowsky Hoelzer's medium. The inoculation of a culture of this race was followed by the development of lysins against the spirochaetes of the original attack and their titre rose suddenly after the first febrile attack then showed a slight fall before the first relapse followed by a second rise that started before the relapse and continued for a few days afterwards finally there was a second fall to a level at which the titre remains more or less constant. The first relapse was succeeded a few days later by the development of lysins against first relapse spirochaetes but their titre only rose to a level less than one hundredth that of the lysins against the original attack. Probably as a result of this low titre of lysins against the relapse spirochaetes patients who have been infected by the inoculation of organisms cultured from an original attack may be reinfected by the inoculation of spirochaetes cultured from either the first or second relapse. The author maintained these three modifications of a race of *S. recurrentis* in culture and found that their immunological properties remained distinct

E. H.

NICOLLE (Charles) ANDERSON (Charles) & RAHAL (Magid) Contamination simultanée de laboratoire par deux virus récurrents. [A Laboratory Infection with Two Strains of Relapsing Fever simultaneously]—*Arch Inst Pasteur de Tunis* 1929 Mar Vol. 18 No 1 pp 55-62. With 1 chart in text

One of the laboratory workers suffered from an attack of relapsing fever unquestionably acquired in the laboratory. The inoculation of his blood into guinea-pigs, rats and mice resulted in them all becoming infected with spirochaetosis and the pathogenicity of the spirochaete for guinea-pigs showed that it must be either *S. hispanica* its var. *marocana* or *S. sogdiana*. Cross immunity experiments showed that both *S. marocana* and *S. sogdiana* were present in the virus isolated from the patient. [This is the first record of the latter species occurring in man]

E. H.

NICOLLE (Charles) ANDERSON (Charles) & HORNUS (Pierre) Sur un nouveau spirochète d'un cas de fièvre récurrente du Maroc. [A New Spirochaete from a Case of Relapsing Fever in Morocco]—*C. R. Acad. Sci.* 1929 May 6 Vol. 188 No 19 pp 1211-1213

This spirochaete was isolated from a case of relapsing fever in a European at Bou Znika. Although the infection in its long duration (eight attacks) resistance to arsenicals etc. resembled ordinary tick fever the results of animal inoculation experiments were peculiar. Thus the spirochaete is pathogenic to guinea-pigs as well as to the common small rodents and monkeys. The immunity following an attack is complete against the same strain for at least a month, whilst against *S. hispanica* the Spanish relapsing fever strain, the immunity is complete for 15 days and still present to a lesser degree after a month. There was no immunity however against the Moroccan variety of *S. hispanica*, although this strain was obtained from ticks at

Mansouria, Morocco only a short distance from Bou Znika. Experiments with the serum of this new spirochaete gave complete agglutination with the homologous organism, but only partial with *S. hispanica* and negative results with *S. hispanica* var *marocana*. The organism seems to be transmitted by *Ornithodoros maroccanus* and attempts with lice gave negative results. In this respect the spirochaete resembles the Moroccan strain, but differs from the Spanish one. Three races of spirochaetes transmitted by *Ornithodoros* have now been isolated in Morocco all of which show minor differences, and this last one shows closer affinities with the Spanish race, so far as serological reactions are concerned. It is evident, therefore that these reactions can have little significance for the distinction of spirochaetes, for there can be little doubt that the three races in Morocco all transmitted by *O. maroccanus* and all pathogenic to guinea-pigs, must belong to the same group.

The authors very aptly call attention to the bearing of these observations on the naming of spirochaetes, for if each race, identified only on its serological properties was given a distinct name, the result would be a large number of specific names of little or no significance. The authors propose to call these Moroccan races *S. hispanica* var *marocana*, from Mansouria or from Bou Znika, etc., thus merely adding the name of the locality from which the race is obtained, without any specific designation.

E. H.

NICOLLE (Charles) ANDERSON (Charles) & COLAS-BELCOUX (Jacques).
Adaptation expérimentale de spirochètes récurrents à des ornithodores autres que ceux qui les transmettent dans la nature.
[The Experimental Adaptation of Relapsing Fever Spirochaetes to *Ornithodoros* other than those which transmit them in Nature.]—
C R Acad Sci 1928. Dec. 10. Vol. 187 No. 24 pp 1105-1107. Also in Arch Inst. Pasteur de Tunis. 1929 Mar Vol 18. No 1 pp. 53-64.

A brief statement of the authors' views on this subject, based to a large extent on their experiments. As a rule, in nature any particular relapsing fever transmitted by *Ornithodoros* is found to be associated with some particular species. There are partial exceptions to this rule, such as *O. maroccanus* which transmits *S. hispanica* in Spain and in Morocco *S. marocana*. The same spirochaete, *S. normandi* at Carthage is transmitted by two species of ticks *O. erraticus* and *O. normandi*. Experimentally it seems to be the rule that any species of *Ornithodoros* can serve as a host for any strain of relapsing fever spirochaete. *O. monbali* in addition to tick fever (*S. duttoni*) has been shown capable of transmitting *S. hispanica*, *S. marocana*, *S. sogdiana* and *S. normandi*. *O. scirgus* can also transmit all these spirochaetes. *O. maroccanus*, all except perhaps *S. normandi*. *O. normandi* transmits in addition to *S. normandi*, *S. duttoni* and *S. sogdiana*.

In order to effect transmission it is necessary to employ the nymphal stage for the adults although becoming infected rarely become capable of transmitting the infection by their bite. Secondly the blood of the vertebrate host should contain numerous spirochaetes. Whenever an experiment has been continued long enough, hereditary transmission was observed in the ticks. This transmission seems to be capable of

passing through several generations when the *Ornithodoros* is the natural carrier but disappears sooner when the tick is a strange host. For example *S. hispanica* in *O. moubata* will only pass through three generations. Any attempts to pass from *Ornithodoros* to another genus of ticks or other invertebrate carriers meets with great difficulties and they only partially succeed e.g. *S. gallinarum* in *O. maroccanus* *S. hispanica* and *S. duttoni* in the louse

It is evident that the relation between any particular spirochaete and the *Ornithodoros* by which it is transmitted is merely a geographical one. Consequently the habits of these ticks is the only check on the spread of the spirochaetes they transmit

E H

TALICE (Rodolfo V) Sur le rôle du *Pediculus vestimenti* dans la transmission de la fièvre récurrente espagnole (expérimentation sur l'homme et les animaux) [The rôle of *P. vestimenti* in the Transmission of Spanish Relapsing Fever.]—*Ann Parasit Humains et Comparée* 1929 May 1 Vol. 7 No 3 pp 177-189 [9 refs.]

Attempts to transmit Spanish relapsing fever by means of *Pediculus humanus* in 13 men, 13 mice 7 rats and 1 monkey were negative with the exception of one of the human cases. This patient showed spirochaetes in his blood 18 days after being inoculated with an emulsion of infected lice but sub-inoculations into laboratory animals were negative and also *Ornithodoros* fed on this patient did not become infected. It is evident, therefore that the louse is not a favourable host for the Spanish strain of relapsing fever

E H

NICOLLE (Charles) & ANDERSON (Charles) Sur la nécessité de l'identification et d'un contrôle des spirochètes récurrents entretenus dans les laboratoires [The Necessity of Identification and Control of Relapsing Fever Spirochaetes kept in Laboratories.]—*Arch Inst Pasteur de Tunis* 1929 Mar Vol. 18 No 1 pp 73-83 With 1 fig [3 refs.]

The authors in a previous communication [see this *Bulletin* Vol. 25 p 596] called attention to the danger of different strains of spirochaetes becoming mixed in the course of laboratory experiments. The present article contains two striking examples of such confusion, strains obtained from laboratories as the European relapsing fever strain, *S. recurrentis* being found to be in one instance *S. duttoni* and in the other an unknown virus differing from both *recurrentis* and *duttoni*

The practical consequences are then discussed and the authors strongly advise all laboratories to get rid of any strains of spirochaetes when there is the slightest doubt as to their origin. In conclusion a list is given of the strains kept at the Pasteur Institute of Tunis. These are generously placed at the disposition of any laboratories requiring them.

List of Relapsing Fever Spirochaetes kept at the Pasteur Institute Tunis
A Strains isolated by the Pasteur Institute Tunis

- (1) *S. hispanica* var *marocana* isolated from *Ornithodoros maroccanus* in Province of Bou Znika, Morocco December 1926

- (2) *S. normandi* isolated from *O. normandi* in Province of Kel, Tunis, May 1927
- (3) *S. gondii* isolated from *Ctenodactylus gondii*, in Province of Matmata, Tunis, May 1928.
- B. *Strains from other laboratories tested at the Institute*
- (4) *S. hispanica*, isolated by S. de Boen from *Ornithodoros maroccanus* in Spain, and obtained from Prof. Brumpt.
- (5) *S. duttoni*, isolated by Ourlilean and obtained from Prof. Mesnil.
- C. *Strains tested at the Institute which will not be maintained indefinitely*
- (6) *S. crocidurae* isolated by C. Mathis from the blood of a shrew mouse at Dakar. This spirochaete is identical with *S. duttoni*.
- (7) *S. egyptensis* isolated from *Ornithodoros papillipes* from Province of Bokhara, Russian Turkestan, March, 1928.
- (8) A spirochaete pathogenic to guinea-pigs, isolated by P. Hornus from human cases of relapsing fever in Morocco.
- (9) An undetermined spirochaete known as the Amsterdam virus, obtained from Prof. Bruynoghe who had previously received it from Prof. Schöffner as a strain of *S. recurrentis*.
- D. *Strains which have been studied and then abandoned*
- (10) *S. normandi* var. *carthagenensis* isolated from *Meriones shawi*, in Province of Carthage, June, 1927.
- (11) *S. normandi* an undetermined variety isolated from *Ornithodoros erraticus* from Carthage, May 1928.
- (12) *S. duttoni* a strain from Kling Laboratory Stockholm.

E. H.

ARISTOWSKY (W. M.) & HOELTZER (R. R.) Ueber die morphologische Veränderlichkeit der *Spirochaeta Obermayeri*. [The Morphological Variability of *Spirochaeta recurrentis*.]—*Zeits. f. Bakt. I. Abt.* Orig. 1929 May 10. Vol. 112. No. 1/2. pp. 44-49. With 2 text figs.

Cultures of *S. recurrentis* after having been maintained in the laboratory for a considerable period, were found to contain two distinct types of spirochaetes. One type, resembling the typical form occurring in the blood, was composed of individuals with uniform, moderate-sized spirals, and was the only type found in earlier cultures. In later cultures a second type appeared with irregular spirals, suggesting the disappearance of the axial filament around which the regular spiral of the first type is arranged. These second type organisms are very distinctive in their irregular appearance and in two-year-old cultures were found to have almost replaced the original form. It is of great interest that the inoculation of these second type spirochaetes into patients resulted in the development of typical relapsing fever and the spirochaetes in the blood were of the second type, resembling those that had been inoculated. Consequently their appearance cannot be explained as a direct response of the organism to the physiological conditions of the culture media, as suggested by ZUELZER. The fact that spirochaetes can present morphological variations of this nature without any corresponding change in pathogenic properties is further evidence in support of the view that it is impossible to distinguish these organisms by means of their form.

E. H.

MELNEY (Henry Edmund) **Suppression of the First Attack with Subsequent Relapse an Immune Phenomenon in Experimental Relapsing Fever**—*Jl Experim. Med* 1928 Dec. 1 Vol. 48. No 6 pp 805-809 [3 refs.] [Peking Union Med. College Peking, China & Dept. of Preventive Medicine & Public Health, Vanderbilt Univ Nashville Tennessee.]

A continuation of the author's observations on splenectomized squirrels infected with *Spirochaeta recurrentis* in which six strains were isolated as the result of relapses. Whereas the strains appearing in alternate attacks were related to each other those in consecutive attacks were immunologically distinct [ante p 117]. In five cases delayed attacks occurred when animals were reinoculated with a strain of spirochaetes which had recently been present in the blood and this delay seems to be due to suppression of the first attack. This was proved by the fact that the spirochaetes of the delayed attack belonged to a different strain from the one inoculated, showing they were relapse spirochaetes. In these immunized animals, when spirochaetes are injected most of them are destroyed, but a few are able to adjust themselves to the environment. In other words this is the same position as at the end of the first attack when the spirochaetes in the blood are destroyed by the development of immune bodies. In both types of animals a few spirochaetes survive and undergo a biological change into a new strain. About 6 days is enough for the spirochaetes of the new strain to multiply sufficiently to be evident in the blood. This is the negative period and is followed by the relapse due to the new strain of spirochaetes. This phenomenon emphasizes that in relapsing fever any immunity is restricted to the strain or strains producing it, or to closely related strains.

E H

JAKIMOW (W Ph) **Versuche passiver Immunisierung bei experimenteller Rekurrens** [A Study of Passive Immunization in Experimental Relapsing Fever]—*Ztschr f Immunitäts u Experim Therap* 1929 Vol. 59 No 3/4 pp 288-297 [14 refs.] Also in *Rev Microbiol Epidemiol et Parasit* 1929 Vol. 8 No 1 pp 3-10 [14 refs.] [In Russian German summary p 111]

It is well known that spirochaetal infections may persist in the body and produce a type of immunity known as *immunitas non sterilisans*. The author has investigated the immunity problem in mice and rats infected with relapsing fever spirochaetes and finds that by the inoculation of immune sera a passive immunity can be produced which is obviously not the result of any persistent organisms. The intensity and stability of this passive immunity depends on the intensity and concentration of the immune serum. There seem to be two types of protection against spirochaetal diseases therefore first the persistence of a residual infection protecting the host against subsequent attacks and secondly the development of immune bodies. When a passively immunized animal is inoculated the incubation period is prolonged up to 14 days, the type of spirochaete modified and the number of attacks diminished.

[The prolongation of the incubation period is probably the result of suppression of the first attack, which would explain the modification of the strain Cf MELNEY above.]

E. H

- (2) *S. normandi* isolated from *O. normandi*, in Province of Kef, Tunisia, May 1927
- (3) *S. gondi*, isolated from *Ctenodactylus gondi* in Province of Matmata, Tunisia, May 1928
- B. *Strains from other laboratories tested at the Institute*
- (4) *S. hispanica* isolated by S. de Boen from *Ornithodoros maroccanus* in Spain, and obtained from Prof. Brumpt.
- (5) *S. duttoni* isolated by Ouxilleau and obtained from Prof. Mesnil.
- C. *Strains tested at the Institute which will not be maintained indefinitely*
- (6) *S. crocidurae* isolated by C. Mathis from the blood of a shrew mouse at Dakar. This spirochaete is identical with *S. duttoni*.
- (7) *S. syriana* isolated from *Ornithodoros papillipes* from Province of Bokhara, Russian Turkestan, March, 1928.
- (8) A spirochaete pathogenic to guinea-pigs, isolated by P. Hornus from human cases of relapsing fever in Morocco
- (9) An undetermined spirochaete known as the Amsterdam virus, obtained from Prof. Bruynoghe who had previously received it from Prof. Schöffner as a strain of *S. recurrentis*.
- D. *Strains which have been studied and then abandoned*
- (10) *S. normandi* var. *carthagenensis* isolated from *Veronema akurii*, in Province of Carthage, June, 1927
- (11) *S. normandi* an undetermined variety isolated from *Ornithodoros erraticus* from Carthage, May 1928.
- (12) *S. duttoni* a strain from Kling Laboratory, Stockholm.

E. H.

ARISTOWERY (W. M.) & HOELTZER (R. R.). Ueber die morphologische Veränderlichkeit der *Spirochaeta Obermayeri* [The Morphological Variability of *Spirochaeta recurrentis*].—Zent. f. Bakt. I. Abt. Orig. 1929 May 10. Vol. 112. No 1/2 pp. 44-49 With 2 text figs.

Cultures of *S. recurrentis*, after having been maintained in the laboratory for a considerable period, were found to contain two distinct types of spirochaetes. One type resembling the typical form occurring in the blood, was composed of individuals with uniform moderate-sized spirals, and was the only type found in earlier cultures. In later cultures a second type appeared with irregular spirals, suggesting the disappearance of the axial filament around which the regular spiral of the first type is arranged. These second type organisms are very distinctive in their irregular appearance and in two-year-old cultures were found to have almost replaced the original form. It is of great interest that the inoculation of these second type spirochaetes into patients resulted in the development of typical relapsing fever and the spirochaetes in the blood were of the second type, resembling those that had been inoculated. Consequently their appearance cannot be explained as a direct response of the organism to the physiological conditions of the culture media, as suggested by ZUELZER. The fact that spirochaetes can present morphological variations of this nature without any corresponding change in pathogenic properties is further evidence in support of the view that it is impossible to distinguish these organisms by means of their form.

E. H.

LEBEDJEWA (M N) Ueber den Einfluss exogener Bedingungen auf den Neurotropismus der Recurrensspirochäten I Die Rolle des Traumas im Prozesse der Spirochätenansiedlung im Nervengewebe. [The Influence of Exogenous Conditions on the Neurotropism of Relapsing Fever Spirochaetes. I. The Role of Injury in the Process of Spirochaetes settling in the Nerve Tissue.]—*Ztschr f Immunitätsf u Experim Therap* 1929 Vol 61 No 5/6 pp 505-508 [5 refs.] [Microb Research Inst. Education Commissariat R.S.F.S.R. Moscow]

The author made experiments to determine whether injury to the brain tissue favoured the development of residual brain infection with *Spirochaeta recurrentis*. The method employed was to pass a fine scalpel into one side of the brain of an infected mouse at the height of infection but of 21 mice treated in this manner 18 showed residual brain infections whilst out of 33 uninjured mice 28 showed residual infections. It is evident, therefore, that injury to the brain has no influence on the persistence of spirochaetal infection in this organ. [ROSENHOLZ, OWSJANNIKOWA & TREFILOW claimed that brain injury did favour such infections. *Ante* p 113.]

E. H.

MANIERI (Alberto) & GORI (Pio) Infezione ricorrente sperimentale nel coniglio Di un particolare neurotropismo della spirochaeta Duttoni. [Experimental Infection of Rabbits. Special Neurotropism of *S. duttoni*.]—*Sperimentale* 1929 Vol. 83 No 1 pp 5-20 [14 refs.] [Inst of General Path. Univ Florence]

This paper contains several points of interest. Owing to the fact that spirochaetes are not found in the blood of rabbits after inoculation, most investigators have attributed to this animal a natural immunity to infection. The authors made use of a strain of *S. duttoni* which had been subcultured into white mice over a period of about two years. 5 cc. of a culture of the organisms was inoculated intravenously and at intervals from 15 minutes to 48 hours afterwards the blood was withdrawn and examined by dark-ground illumination and by inoculation into white mice. The results were completely negative. They next injected 5 cc. of citrated blood taken from a rat during an attack. The blood of the rabbit showed spirochaetes in $\frac{1}{2}$ and 1 hour after and positive results followed injection into white mice from 15 minutes to 4 hours after. Later than this the results were negative.

In the next experiment four inoculations of the blood of an infected rat were made and the rabbit's blood tested in the same way by dark-ground and by injection into mice. After the first injection the results were practically the same as those just detailed. After the second all were positive but for a much shorter time the blood infecting mice only when injected a half to one hour after the rabbit had received inoculation. After the third, two rabbits out of four showed organisms in the blood microscopically after a half and one hour respectively and two after half an hour by animal injection. After the fourth inoculation all were completely negative.

The inference is drawn that repeated inoculation leads to increasing destructive properties in the rabbit's blood. By attempting to cultivate the spirochaetes from the blood after the inoculations the authors found definite indications of lysis of the organisms.

Lastly series of rabbits were inoculated four times on alternate days with spirochaetes from rats as before some intravenously other intraperitoneally one of each was killed 3, 5 10 and 15 days respectively after the last injection and the brain, spleen, liver and blood examined by inoculation into mice. In every instance the brain proved to be infective, all the other organs and tissues negative. From this it follows that the spirochaete in question has a definite neurotropism for whether injected intravenously or intraperitoneally it tends to locate itself in the cerebral tissue. This fact is considered to have a bearing on the beneficial results of injection of spirochaetes in cases of cerebral syphilis.

H. Harold Scott.

SCHLOSSBERGER (H.) & WICHMANN (F. W.) Experimentelle Untersuchungen ueber *Spirochaeta crociduras* und *Spirochaeta hispanica*. [Experimental Studies of *S. crociduras* and *S. hispanica*.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1929 Apr. 8 Vol. 109 No. 3 & 4 pp. 493-507 [Numerous refs.] [State Inst. for Exper. Therapy Frankfurt a. M.]

The authors used a strain of *Spirochaeta crociduras* obtained from MATIS in Senegal, and a strain of *S. hispanica* obtained from NICOLLE in Tonkin. The course of the infections was studied in rabbits, guinea-pigs, rats and mice. In the case of *S. crociduras* inoculated rats and mice showed spirochaetes in the blood for several days, rabbits only for one or two days in the first attack, and then for brief intervals at the subsequent one or two relapses, whilst guinea-pigs generally were negative to microscopic examination. However the blood of these guinea-pigs was found by subinoculation experiments to contain the infection in the blood for at least 39 days, even in animals that had never shown spirochaetes in the blood. On the contrary the blood of rats, mice and rabbits, as tested by subinoculation, soon became negative after one or two relapses. Inoculations of *S. hispanica* into these four species of animals was invariably followed by the appearance of spirochaetes in the blood and the development of two or more relapses.

With regard to residual brain infections, in *S. crociduras* the spirochaetes persisted in the brain of rabbits, mice and rats up to 191 days after inoculation, even when the blood was negative, and in guinea-pigs 24 to 120 days after inoculation the brain was also found to be infected. With *S. hispanica* residual brain infections were invariably found in rats, guinea-pigs and rabbits and in 50 to 70 per cent. of inoculated mice. The infection has only a slight pathogenic action in rats, mice and rabbits but is very pathogenic to guinea-pigs. Cross immunity experiments showed that *S. crociduras* is very closely related to *S. duttoni* as shown by NICOLLE & ANDERSON [this Bulletin Vol. 25, p. 596] and MATIS [ante p. 116]. On the other hand, *S. hispanica* was found to be quite distinct from other strains of relapsing fever. A certain number of rabbits and mice were inoculated with syphilis and subsequently with *S. crociduras* whilst in others the order of the infection was reverse. In no instance was any effect observed, syphilitic animals behaving exactly the same as normal ones in the course of infection with relapsing fever and vice versa.

E. H.

TALICE (R. V) & SURRACO (N) Sur la culture du *Treponema hispanicum* [The Culture of *Treponema hispanicum*].—*Ann Parasit. Humaine et Comparée* 1929 Mar 1 Vol. 7 No 2 pp 133-139 With 3 charts in text [5 refs.] [Hyg Inst. Montevideo]

An account of the successful cultivation of this spirochaete in a simplified modification of Ungermann's medium [see this *Bulletin* Vol. 25 p 595] The rabbit serum was not inactivated, no blood was added and the cultures were grown anaerobically at 37° C. Under these conditions the spirochaetes were kept *in vitro* for 160 days with 43 passages without showing any alteration in virulence as shown by inoculations at various times into 20 experimental animals and 14 human patients.

E. H

SPARROW (Hélène) LUMBROSO (Ugo) & LAPIDARI (Mario) Etude comparative de quelques spirochètes récurrents par la méthode de l'agglutination [Comparative Study of Relapsing Fever Spirochaetes by the Method of Agglutination].—*Arch Inst Pasteur de Tunis* 1928 Dec. Vol. 17 No 4 pp 279-294 With 7 graphs. [5 refs.]

The authors obtained their immune sera by collecting the blood of animals ten days after they had recovered from an attack of the relapsing fever under examination. Infected blood was used to obtain the spirochaetes, as cultures were found to give very unsatisfactory results.

The authors' results are given in tabular form and with few exceptions agree with the existing views on the distinction of relapsing fever spirochaetes. The reactions were found to be quite specific and are recommended as being easy to use.

E. H.

MURAYAMA (Iseo) [On the Resisting Power of Spirochaete Recurrens to the Temperature, Light and Darkness].—*Okayama-Igakkaish-Zasshi* (Zoni d. Okayama Med. Gesellschaft) 1929 Jan. Vol. 41 No 1 pp 137-151 [7 refs.] [In Japanese. English summary p 152.] [Dermat. Inst. Univ Okayama.]

When mice inoculated with relapsing fever spirochaetes were kept in sunlight the incubation period of the infection was found to be longer than when similar animals were kept in the dark room or in the ordinary laboratory. When the mice were kept at 33°-36° C the incubation period was the shortest, and as the temperature was lowered to freezing point the incubation period gradually lengthened.

[No figures are given concerning either the number of animals used in these experiments, or the amount of variation produced in the incubation period by the different conditions of light and temperature.]

E. H

BRUNNEKREFT (W. H.) & OXGRIEHONG (H. F.) Broncho-spirochaetosis op. Bah. [Bronchospirochaetosis on Bali Island].—*Geneesk Tijdschr v Nederl Indië* 1929 Jan. 21 Vol. 69 No 1 pp 29-36. [8 refs.]

Among the Chinese, reporting for treatment of their opium habit, the authors found many cases of broncho-spirochaetosis. Most of

these Chinese were newcomers to Bali and the authors think that they imported the disease into the island. This becomes still more probable by the comparatively frequent occurrence of broncho-spirochaetosis in Balinese women married to Chinese and in other people who have been in contact with Chinese. In people from purely Balinese villages the finding of spirochaetes was uncommon. A short account of the symptomatology and a few case reports (2 chronic and 4 acute cases) contain no novel features. The prognosis of the disease is comparatively good, except in cases wherein complications with malnutrition, acute or chronic infectious diseases may bring on a rapid fatal course.

W J Bain.

GIORDANO (Mario) Contributo allo studio sperimentale dello spirochetosi dell'apparato respiratorio. [Experimental Study of Respiratory Spirochaetosis].—*Arch Ital. Sci. Med. Colon* 1928, Sept. Vol. 9 No. 9 pp. 517-550. With 15 figs. on 4 plates. [Inst. of Colonial Path. Univ. Bologna.]

The first part of this long article is given up to a detailed description of six cases of pulmonary disease with symptoms of fever (not high, average about 38° C.) cough with purulent and sometimes sanguinolent expectoration, and emaciation. The sputum contained numerous spirochaetes and fusiform bacilli, which diminished gradually in number under treatment and finally disappeared.

H. Harold Scott.

ONORATO (Raffaele) A proposito di spirochetosi dell'apparato respiratorio. [Remarks on Respiratory Spirochaetosis].—*Arch. Ital. Sci. Med. Colon* 1928, Oct. Vol. 9 No. 10. pp. 581-584.

In this brief paper or rather full note, Professor Onorato refers to the experimental work of GIORDANO and shows how the latter confirms almost entirely his own work done in 1920 on the same subject the lesions being due to the symbiosis of the *Spirochaeta bronchialis* or of Vincent's spirillum, with the fusiform organism which he denominates *Bacillus ledantici*.

H. Harold Scott.

LOREANNO (N) Cases of Bronchospirochaetosis in Greece.—*Jl. Trop. Med. & Hyg.* 1929, Apr. 1 Vol. 32. No. 7 pp. 98-99. [3 refs.]

An account of two cases in which the presence of spirochaetes in the sputum, combined with the absence of other pathogenic organisms, led to the diagnosis of bronchial spirochaetosis. Treatment with stovarsol cured the first case.

E. H.

VOIZARD (F. F. E.) & RAULT La spirochétose respiratoire [Bronchial Spirochaetosis].—*Arch. Méd. et Pharm. Milit.* 1929, Feb. Vol. 60. No. 2. pp. 179-206. With 1 chart in text. [4 pages of refs.]

A general review of the subject. Nothing original.

E. H.

ILBERSTERN (Ernst) Studien zur Frage der Darmspirochäten.
[The Question of Intestinal Spirochaetes.]—*Wien Klin Woch*
1929 Mar 14 Vol. 42. No 11 pp 327-331 [5 refs.]

The author gives a useful summary of many previous observations on his subject and in his introduction gives the results of the examination of gut spirochaetes of a large number of vertebrates. With regard to the possibility of blood spirochaetes invading the gut mice infected with relapsing fever were killed at various stages of the disease and their alimentary tracts carefully examined, any containing actual red cells being omitted. Spirochaetes were numerous in the stomach and in fewer numbers were also found in the ileum, caecum and rectum. Those in the stomach and small intestine seemed to be derived from the blood infection but those in the caecum and rectum were mostly normal inhabitants of the gut. A few observations are recorded on the effect of mercury poisoning on the gut spirochaetes, supporting the view that mercury has no effect on them [see PARR, this *Bulletin* Vol. 21 p 264]. Regarding the examination of infants spirochaetes were occasionally found in the stools of 7 day old children, whilst others were negative up to the 13th day and there seems little doubt that the infection must be acquired after birth.

Finally the author describes in detail four cases which all contained very large numbers of intestinal spirochaetes and discusses the difficult question of their pathogenic significance. In the first two cases the presence of large numbers of spirochaetes in the stools seemed to be a secondary effect and was associated with the existence of pathogenic Protozoa in the intestine. The other two cases were (1) a fatal attack simulating acute appendicitis and peritonitis and (2) a chronic retro-sigmoiditis haemorrhagica which cleared up under treatment together with the disappearance of spirochaetes. In both these cases the presence of very large numbers of spirochaetes in the intestine suggests the possibility of their pathological significance although there is no clear evidence on this point.

E. H.

DELAMARE (G) & GATTI (C) Spirochètes et tréponèmes d'un granulome vénérien. [Spirochaetes and Treponemata from a Case of Granuloma venereum.]—*C R. Acad Sci* 1929 Mar 18 Vol. 188. No 12. pp 885-887 With 4 text figs.

The serous fluid from the plaques of cases of this disease was found to contain numerous spirochaetes belonging to two distinct types. The first type was composed mainly of organisms resembling *S. refringens* var. *balantidis* but some approached *ourygyratum*. The second type resembled the fine variety of *S. dentium* and when stained closely approximated the appearance of *S. pallida*. This association of *S. refringens* and *S. dentium* has been previously recorded and the general conclusion is that it has no pathological significance. The authors tried to infect a monkey with the secretion but with negative results. The spirochaetes disappeared from the plaques when treated with arsenic, mercury or bismuth, whilst the granulomatous conditions was unaffected until antimony was used. The authors raise the question as to whether the spiral organisms found in the lesions of cases of syphilis and yaws may not be saprophytes on skin or mucous membrane infected with some virus.

E. H.

attention to the number of cases of supposed Weil's disease in which leptospira cannot be detected, and also to the fact that the disease can be reproduced in other guineapigs by the inoculation of emulsions of organs in which the specific agent cannot be detected by either microscopical examination or culture.

A strain of *L. icterohaemorrhagiae* in guineapigs was found to be associated with a streptococcus all but one of the animals dying of septicaemia due to this latter organism. A strain of *S. endocarditis* was found to be associated with a variety of organisms. Finally the authors discuss the histopathology of infections due to leptospira alone and those in which secondary infections have caused a fatal termination.

[Those interested should consult the original articles for the evidence on which the authors base their opinion. The reviewer finds their arguments very unconvincing and some of the statements, particularly those dealing with "*L. icteroides*" and yellow fever are based on erroneous observations. The statement as to the general presence of secondary organisms in guineapigs dying of infection with *L. icterohaemorrhagiae* is not supported by the experience of Dr. O'NEILL at the Wellcome Physiological Research Laboratories, who in the routine examination of more than 200 guineapigs, invariably found enormous numbers of leptospira in the livers of animals dying of the disease. Moreover cultures were made from many of these and no difficulty experienced in obtaining growth of the leptospira without any contaminating organism.]

E. Hindle.

SARDJITO (M.) & ZUELZER (Margarete) Weiterer Beitrag zur Biologie der *Spirochaeta biflaxa* syn. *Leptospira icterohaemorrhagiae* syn. *Spirochaeta icterogenes* in den Tropen. [A Further Study of the Biology of *Spirochaeta biflaxa* syn. *Leptospira icterohaemorrhagiae* syn. *S. icterogenes* in the Tropics.]—*Nederl. Dienst d. Volksgezondheid in Nederl. Indië* 1928 Vol 17 Pt. 4 pp 535-544. [Med. Lab. Weltevreden.]

An interesting study in which an attempt is made to elucidate the conditions influencing the occurrence of the water leptospira, *S. biflexa*. In Europe these spirochaetes are much more restricted in their prevalence and growth than in Sumatra, and also Weil's disease is much less prevalent. On the East Coast of Sumatra, spirochaetes are found in every kind of water running streams ponds etc. and cases of Weil's disease occur the whole year round. In the neighbouring island of Java, the waters on the West Coast were found to be almost free from spirochaetes and also Weil's disease is very rare. Analysis of the waters of the two districts showed that the presence or absence of spirochaetes is correlated with differences in the pH of the water. In Western Java the majority of the waters had a pH of about 6.0, whilst in Sumatra they were generally well above 7.0. The optimum condition for the growth of water spirochaetes seem to be a pH of about 7.3-7.8 or 8.0 combined with a temperature of 28-30° C. These conditions are found in Eastern Sumatra and consequently water spirochaetes and also Weil's disease are common, whilst in Western Java, although the temperature conditions are favourable, the pH of the water is rarely high enough to permit the growth of spirochaetes, and consequently Weil's disease is correspondingly rare.

E. H

BESSEMANS (A.) & THIERY (U) Présence dans l'eau de distribution de la ville de Gand d'un leptospire pseudo-ictérogène pathogène pour la souris [The Presence in the Town Water of Ghent, of a pseudo-icterogenous *Leptospira*, Pathogenic for Mice.]-C R. Soc Biol 1928 Dec. 21 Vol. 99 No 37 pp 1881-1883 [5 refs] [Inst of Hyg & Bact Univ Ghent.]

Cultures of Ghent tap water in Vervoot's medium, covered with a layer of paraffin and kept in the dark at 28° C. were found to contain leptospira after 35 days incubation period. The cultures were heavily contaminated with other organisms but by subculturing every ten days the culture became both richer and less contaminated. An antiserum was prepared by injecting a rabbit with the contents of these cultures and found to agglutinate *L. icterohaemorrhagiae* as well as the tap water leptospira. On the contrary the lysin reaction with guineapig complement and fresh or inactivated immune serum gave specific results. Inoculations into guineapigs gave negative results so the authors at the 14th subculture attempted to infect mice. Out of seven inoculated subcutaneously four died after 14 to 27 days and of four inoculated intraperitoneally one died after 11 days. Subinoculations into other mice were successful and the mice died after 25 to 29 days. The infected mice showed leptospira in the blood and urine and from the second week the animals were obviously ill. At autopsy the organisms were recovered in pure culture from the bladder and they were common in the kidney though absent from other organs. Inoculation of these organisms into guineapigs gave negative results although mice could be infected.

[These results support ZUELZER's view that the ordinary water leptospira may acquire pathogenic properties—see this *Bulletin* Vol. 25 p 602.]

E. H.

DARGEIN & BIDEAU Un cas de spirochétose ictérohémmorragique [A Case of Spirochaetal Jaundice.]-*Bull et Mém Soc Méd Hôpit de Paris* 1929 Mar 25 3rd Ser Year 45 No 10 pp 403-404

The record of a case of this disease in a sailor. On the seventh day of the disease a guineapig was inoculated with the sediment from 20 cc. of centrifuged urine and died of typical infectious jaundice 13 days later. Spirochaetes were present in films from this animal but were not found in the inoculum. Two other guineapigs inoculated one at the same time as the urine and the other 10 days later with the blood of the patient, remained uninfected.

E. H.

AUBERTIN (Ch.) & POUMAILLOUX (M.) Spirochétose ictérohémmorragique mortelle d'origine hydrique [Fatal Spirochaetal Jaundice of Aquatic Origin.]-*Bull et Mém Soc Méd Hôpit de Paris* 1929 Feb 4 Year 45 3rd Ser No 9 pp 114-119 [5 refs]

The description of a fatal case of this disease. Spirochaetes were not found and inoculation into a guineapig gave negative results, but the patient's blood agglutinated *Leptospira icterohaemorrhagiae*.

E. H.

TEXIER (Léon) & DE SÈZE (Stanislas). Un nouveau cas de spirochètose ictéro-hémorragique professionnelle d'origine fluviale certaine. Inoculation au cobaye négative à la recrudescence. [A New Case of Spirochaetal Jaundice of Aquatic Origin. At Relapse, Inoculation into Guinea-pigs Negative.]—*Bull et Mém Soc Méd Hôpitaux de Paris*. 1929 Jan. 21 Year 45 3rd Ser No 1 pp 17-19

The record of a case at Paris of this disease, the nature of which was confirmed by sero-diagnosis.

E. H.

KATZE (H.). Ueber das sogenannte Schlammfieber. [On So-called Slime Fever.]—*Cent. f. Bakt. I. Abt. Orig* 1929 Vol. 110 Beihft. No. 6/8. pp. 54-58

The author considers that this is an abortive form of Weil's disease, as indicated in his previous publication [see p 132]

E. H.

UHLENHUTH & SKIFFERT. Zur Wismuttherapie der Wellischen Krankheit [Bismuth Therapy in Weil's Disease.]—*Cent. f. Bakt. I. Abt. Orig* 1929 Vol. 110 Beihft. No 6/8. pp. 47*-53*

An extension of the authors' paper reviewed in this *Bulletin* Vol. 25, p 809. Details are given of the results of treating guinea-pigs infected with a virulent strain of leptospira, by means of bismuth yatren A and B respectively embul, bisuspen, bismogenol, and trepol or neotropol. The first of these was found to be the best but some of the others also had a curative effect, with the exception of embul and bisuspen which were too poisonous for use. As previously recorded bismuth yatren A, administered at the appropriate stage of the disease, cured all the treated guinea-pigs. With reference to treatment by means of repeated small doses, it was found that two injections each of half the curative dose, separated by an interval of four days, were effective. Yet smaller doses may be employed, for a series of guinea-pigs were cured by six injections each of a quarter the curative dose or less. Bismuth yatren A and neotropol were found to have little effect when administered as a prophylactic bismogenol, on the other hand, when administered the day before percutaneous or intraperitoneal inoculations of the spirochaete, protected the animals against infection.

The mechanism of bismuth therapy is found to depend on an indirect action on the spirochaetes, enabling the body to build up immune bodies against the infection.

E. H.

ZINDERMAN (E.). Aktive und passive Immunisierung gegen Wellische Krankheit bei normalen und blockierten Meerschweinchen. [Active and Passive Immunization against Weil's Disease in Normal Guinea-pigs and those with the Reticulo-Endothelial System blocked.]—*Cent. f. Bakt. I. Abt. Orig* 1929 Vol. 110. Beihft. No 6-8. pp 235* 238*

A study of the persistence of immunity in UHLENHUTH and SKIFFERT's guinea-pigs cured of Weil's disease by bismuth [see above].

showed that animals treated on the 5th or 6th day of infection were immune after 75 days or longer for only 1 out of 15 succumbed to a second inoculation. Other guineapigs treated prophylactically with bismuth or on the second day of infection were less resistant for after a similar interval of 75 days or more, 7 out of 16 succumbed to a re-infection. In some guineapigs the author removed the spleen and blocked the endothelial system by the intracardial injection of 1 cc. of 30 percent ferric saccharate solution. These animals were inoculated with the disease two days later and then treated with immune serum. No difference was observed in the results obtained compared with normal guineapigs similarly infected and cured. In the same way blocked guineapigs were infected and cured by bismuth yatren A and subsequently tested for persistence of immunity. The results show that blockage of the endothelial system has no action on the development of passive immunity nor on the active immunity following treatment with bismuth, nor on the persistence of such immunity

E H

MCKINLEY (Earl B) *Leptospira icterohaemorrhagiae* in Wild Rats of the Philippine Islands.—*Proc. Soc. Experim. Biol. & Med.* 1928. Oct. Vol. 26 No 1 pp 26-28 [8 refs.] [Bureau of Science Manila.]

Examination for leptospira in the wild rats of the Philippines was conducted on 250 rats and the only positive result was obtained by the inoculation of the pooled blood of 6 animals into a guineapig. The author estimates that probably not more than 1 per cent. are infected, and this is in harmony with the rarity of infectious jaundice in that region

E H

TARASOW (S I) Zur Frage der epidemiologischen Vorbedingungen für die Wellenkrankheit in Moskau [The Question of Epidemiological Conditions for Weil's Disease in Moscow]—*Arch. f. Schiffs u. Trop. Hyg.* 1929 May Vol. 33 No 5 pp 282-283 [Metschnikoff Inst. for Infectious Diseases Moscow]

The examination of wild rats resulted in forms resembling spirochaetes being found in the kidneys, but cultures of them were not obtained. The examination of Moscow tap water resulted in finding leptospira which were obtained in pure culture

E H.

treatment, but relapses occurred in at least 75 per cent. of these animals. This observation would suggest that the spirochaete in mice is resistant against salvarsan. On the strength of his observations the author is of the opinion that this disease is caused by a true spirochaete *Spirochaeta morsus moris* which bears no relation to the *Spirillum* present in the blood of mice. This latter organism is considered as probably the only one appearing in the relapses, as the former is supposed to be eradicated by the salvarsan.

E. H.

SKERFVING (E.) Om rättbettajukan. Med anledning av ett fall i Göteborg—*Hygiea*. 1929 Apr 30 Vol. 91 No. 8. pp 318-329 With 1 chart in text [14 refs.]

PARMANAND (M. J.) A Note on *Spirillum minus* (Carter) the Causative Organism of Rat Bite Fever—*Indian Med Gaz.* 1929 Apr Vol. 64. No 4 pp. 190-191 With 1 plate [10 refs.]

POGGI (Igino) Sul soddoku eventuale reperto di spirochete nella bocca del *Mus decumanus*.—*Arch Ital Sci Med Colon* 1927 Sept. & Oct. Vol 8. Nos. 9 & 10 pp 533-547 550-570 With 3 text figs. [30 refs.] *Inst. of Trop. Path Univ Bologna.*

TROPICAL DERMATOLOGY

GUPTA (A) **My Experience about Dermatology in the Tropics.**—*Far Eastern Assoc Trop Med Trans Seventh Congress British India 1927* Vol. I pp 129-135

My main object was to remove the vague impression that exists in our minds that tropical dermatology is entirely different from western dermatology. Certain diseases common in England are rare in India, e.g. infection with *Microsporon audouinii* and *Lupus vulgaris* the low incidence of the latter probably being due to the sunlight. Scrofuloderma is sometimes seen, whilst psoriasis is uncommon and is much modified by the actinic rays. It must also be remembered that most lesions are secondarily infected with pyogenic organisms to an extreme degree. This is partly due to the heat which keeps both the areas moist and the patients lethargic. For the same reason dermatomycoses are far more common than they are in the west whilst the varieties of infecting fungi are far greater in number. Diseases of nervous origin are comparatively rare (e.g. Alopecia areata and Lichen planus) whilst the only trade dermatitis cases so far recognized have been due to jute iodoform *Semecarpus anacardium* teakwood and umbrella polish.

Leucoderma is common and may appear after local irritation, e.g. any dermatitis the wearing of a tight belt etc. The author inclines to the view that the cause is not to be found among the endocrine glands but in the intestinal tract. The best treatment is the local application of babchi prepared from the seeds of *Psoralea corylifolia*.

The following conditions are described as being new in the author's experience —

- (1) A variety of chromokeratosis seen as cayenne-pepper-like staining of the dorsa of the hands
- (2) Domed papules the size of a split pea and dark in tint which appear on the extensor surfaces of the elbows and knees in winter and which disappear in summer
- (3) Similar papules more generalized and showing no seasonal variation. They are common in oil workers and are probably due to an oil folliculitis
- (4) Granulomatous lesions deemed to be septic in origin
- (5) A melanoderma of the face which has a butterfly distribution and which varies in intensity spontaneously
- (6) A localized melanoderma, common on the neck.
- (7) Generalized melanoderma which includes the mucosa. It may start anywhere and then spreads gradually. There is no obvious cause and it is not influenced by treatment

M Sydney Thomson.

BLOCH (Bruno) **The Role of Idiosyncrasy and Allergy in Dermatology**—*Arch Dermat & Syph* 1929 Feb Vol. 19 No 2. pp 175-197 With 9 text figs

The word allergic is here applied to eczema eruptions caused by the use of drugs urticaria, Quincke's oedema and to other diseases which are not of the skin, such as serum sickness asthma and hay-fever. This recent development is remarkable because until a short time

ago allergic processes could be assumed only in diseases caused by living organisms or foreign proteins." The author bases his own definition of allergy on clinical pathology "that state which has as its basis the property of certain groups of cells (organs) of the living organism to react in a specific manner when brought in contact with a substance which is, as far as is known, foreign to the organ or cells the characteristic of this specific pathologic process lies in the fact that it is caused by the reaction of this exogenous substance with its specific cellular fixed antibody. The basis and the essence of allergy is the ability of the living cell to react with the production of specific antibodies to the stimulus of foreign substances, which are therefore called antigens, as well as the fact that the contact of the antigen with its specific cellular fixed antibody causes a disturbance of cellular life which usually results in an inflammatory reaction.

The type and course of the allergic reaction are independent of the nature of the antigen but vary according to the localization of the antibody that is according to which organ reacts to the antigen. Antibodies which are formed by and usually adhere to the cell can become free in the blood and still keep their power of specific reaction with their particular antigen. The possibility of desensitization partly depends on their presence whilst their rôle in diagnosis is equally important, as their demonstration enables it to be said with certainty that one is dealing with a true allergic process. In Bloch's opinion the most efficient of these methods is that devised by PRAOKSTZ and KÜSTNER and by its use it has been proved that non-protein antigens do exist. After referring to experiments which demonstrate that asthma, hay-fever, toxocodermia, urticaria and serum disease are allergic reactions, the author deals more particularly with the problem of eczema.

It is certain that there is not the least evidence of a metabolic disturbance which is common to all or to many types of eczema and which is pathognomonic for this condition of the skin. The more pains one takes in the effort to find the cause in cases of eczema as regards both the history and the functional tests, the more exogenous factors will be found as the real bases for this disease." In his skin tests Bloch uses eczematous substances instead of foodstuffs (e.g. 1 per cent solutions of formaldehyde, sublimate, quinine hydrochloride, etc. and iodolone, primrose leaf adhesive plaster etc.) and such special substances as seem indicated (e.g. fur in suspected fur eczema). These substances are placed on the intact skin and held in place by linen, gutta percha and adhesive tape the results being read 24 hours later and only those giving a definite eczematous reaction are read as positive. The sensitivity may be mono- or polyvalent and may be positive only in certain regions of the body (hence the importance of using healed areas for the tests). In principle a difference does not exist between the so-called artificial eczematous dermatitis and true eczema. Eczema can also be produced by the ingestion of an eczematous substance and therefore there probably do exist some endogenous causes. There is no qualitative relationship between the nature of any causative agent and the nature of the reaction to which it gives rise.

It is pointed out that at one time it was thought that the presence of an individual hereditary disposition was requisite for "idiosyncratic allergens" to create a reaction. Actually the percentage of idiosyncratic persons varies greatly according to which substance is employed as the agent. Also it is possible to render a normal person sensitive to stimuli by painting the skin with a concentrated extract of the plant i.e.

typical idiosyncrasy has been converted into an allergy Attempts to demonstrate antibodies in the serum of persons with *eczematous* idiosyncrasies have all been negative whereas the transference is easy in other types. This may be because it is exceptional for the antibodies to become free in eczema cases, and this would also explain why desensitization and immunity are difficult to obtain in such patients It is however still necessary to study possible influences of the sympathetic system and hormones for perhaps only a part of these manifestations have an allergic basis.

M S T

KLAUDER (Joseph V) *Clinical Aspects of Allergy in Dermatology*—*Arch Dermat & Syph.* 1929 Feb Vol. 19 No 2 pp 198-217 With 4 text figs [46 refs.]

In this article the meaning of allergy is limited to hypersensitiveness the clinical phases being divided into two groups one in which the sensitizing substances are the cause of the patient's symptoms and the other in which they are not the cause (i.e. conditions giving non-specific cutaneous reactions) This is fully illustrated by a diagram The skin diseases in which the author regards the evidence as inconclusive are Besnier's prurigo and Czerny's exudative diathesis. The first or conclusive group is further subdivided into those affections resulting from cutaneous hypersensitiveness only (dermatitis and pruritus) those resulting from somatic hypersensitiveness only (eczema, urticaria, angioneurotic oedema, erythema multiforme, drug rashes) and those resulting from combined cutaneous and somatic hypersensitivity (serum sickness, eczema, urticaria, angioneurotic oedema and pruritus associated with hay fever or asthma) Each condition is then discussed in some detail and five interesting cases are reported in full.

This article and the paper by BLOCH were read at a meeting of the American Dermatological Association in April 1928 The ensuing discussion is also reported in full and the whole will well repay careful study by those interested in this subject

M S T

DA FONSECA (Olympio Oliveira Ribeiro) Algumas considerações de ordem geral sobre as dermatomycoses. [General Remarks on Dermatomycooses.]—*Sciencia Med* 1928 Nov Vol. 6 No 11 pp 565-569

Lesions due to *Microsporon* and *Trichophyton* are fairly common in Brazil. Associated with them and also with other cutaneous affections though not always producing lesions of themselves there have been met with species of *Hormodendrum*, *Cladosporium*, *Aspergillus*, *Penicillium*, *Scopulariopsis* and *Spicaria*.

H Harold Scott

FRIED (S M) & SEGAL (M B) The Hematogenous Production of Dermatomycooses Experimental Studies.—*Arch Dermat & Syph* 1929 Jan Vol. 19 No 1 pp 98-104 [18 refs.]

After describing in sufficient detail previous work which has been done along these lines, the authors give a full account of their own experiments *Trichophyton gypsum* being the fungus used. Great care has

been used to prevent any possible fallacies which might have been from technical errors or accident. They used 29 animals (mostly rabbits) and in 11 i.e. 38 per cent. positive results were obtained. An area on the back or side was shaved and scarified and an emulsion of spores was introduced into a vein. After an incubation period of 12-18 days, lesions appeared on the scarified areas only these being situated on the flanks and carefully guarded from contact with the sites of intravenous inoculation. The disease lasted from 6-12 weeks and the amount of material injected had no apparent influence on the character of the lesions. It is suggested that the scarification leads to local inflammation and during this reaction the spores are able to pass through the capillary endothelium which is normally an impenetrable barrier. There is also a definite elective rôle of the fungus towards the skin.

A second series of experiments in which blood was taken from the heart at varying periods after the original intravenous injection, proved that the bulk of the parasite disappears from the blood within 24 hours some spores may however circulate for as long as 3 days.

M. S. T

JONES (Foster M.) *Fungus Infections of the Hands and Feet*.—*New Orleans Med & Surg J* 1929 Feb. Vol. 81 No. 8. pp. 527-532. With 25 figs. on 2 plates. [4 refs.] [School of Med., Tulane Univ. Louisiana.]

The author considers that fungi are much more commonly concerned in the production of lesions of the exposed parts of the body than is usually believed and insists that the nails are the foci from which repeated re-infections occur. He gives a simplified classification of these organisms and describes the various clinical types of eruption produced by representatives of the different genera. The following method has been devised to determine the presence of fungi. As much diseased tissue as can be conveniently obtained is digested with 10 per cent. sodium hydroxide for 12 to 18 hours at body temperature. The resulting fluid is thoroughly shaken with 2 volumes of ether and the whole then centrifuged for several minutes. The detritus containing the spores and mycelia collects between the two layers of fluid, which are then removed by decantation. The detritus is then shaken with water and centrifuged once more after which the sediment is ready for microscopical examination. Many of the figures are excellent.

M. S. T

SHARP (William B.) & TAYLOR (Evelyn Kerns) *Interdigital Rhizomycosis Control among Students*.—*J. Preventive Med.* 1928. Nov. Vol. 2. No. 6. pp. 435-491. [19 refs.] [Dept. Bact. & Preventive Med. Univ. Texas & Health Service Univ., Chicago.]

This investigation was carried out among University students in Texas. In the first place 278 men were asked to complete a written catechism and from their answers it was computed that 48 per cent. had been infected. Among 181 women similarly questioned 32 per cent. proved to be the corresponding figure. A third group of 220 men were examined clinically and orally 35 per cent. giving positive results. It is stated that only definite cases are included in these figures. It was

It was found that 46 per cent of those who were in the habit of walking about the gymnasia were infected, whilst 38 per cent of those whose shoes had contracted the disease. Scales from the toes and groins kept for 1-2 years and efforts were then made to obtain cultures without success. The conclusion is reached that private rooms act as a source of transmission in even less degree than do public floors. An attempt was made to carry out mass treatment with Whitfield's ointment and as a result the authors are of the definite opinion that the feet were kept healthier thereby although circumstances naturally precluded exact information. The seasonal incidence in June, July and August was very marked in these epidermophyton cases; other varieties of ringworm seen showing no such variation. It is deduced that there is no reason to expect improvement in the prevalence of the disease by means of floor sanitation and foot hygiene. The best methods by which it may be checked are probably the dissemination of information to the public and physical examination.

During this enquiry there was discovered a pathogenic fungus which apparently constitutes a new variety. It was found in 2 toe cases and in 1 pubic case at Galveston, Texas. Microscopically it had swollen clubs and filaments, intercalary chlamydospores and a few brownish blunt aerial fuseaux. The colony itself is larger than is a corresponding growth of *E. inguinale* whilst it is also more downy and of a different colour. There is a central button with 3 or 4 radiating convolutions, the whole having a diameter of 5 cm. on the primary medium (this contained crude malt and Difco, a proprietary preparation of peptone). The centre has a buff tint and is surrounded by a pale green inner zone, this in turn being surrounded by a cream outer zone. Older cultures take on a tint resembling dark tan and are covered with flakes of brown.

M. S. T.

CASTELLANI (Aldo). Further Observations on the Treatment of Epidermophytosis of Toes (Mango Toe) and Certain Other Forms of Epidermophytosis by a Fuchsin Paint.—*Jl Trop Med & Hyg* 1929, Mar 15, Vol. 32, No. 6, pp. 77-79. [2 refs.] [Ross Inst. London, and Tulane Univ. New Orleans.]

The paint is the ordinary carbol fuchsin used in bacteriological laboratories for staining tubercle bacilli, to which 1 per cent of boric acid and 5 per cent acetone and 10 per cent resorcin have been added. Good results are claimed from daily applications of this paint, particularly in foot cases and when secondary infection is present. It is also useful in other forms of epidermophytosis, particularly when there is a moist eczematous reaction to the infection.

M. S. T.

CATANZI (A.). Etude des teignes dans le Sud Oranais (Algérie). [On Ringworm in Southern Oran.]—*Bull Soc Path Exot* 1928, Nov 14, Vol. 21, No. 9, pp. 729-735. [1 ref.] [Pasteur Inst. Algiers.]

The author has investigated the incidence of ringworm among the native children inhabiting this part of Africa. Clinical, microscopical and, where possible, cultural examinations were carried out. A total of 694 were inspected, most of them being of Berber, Arab and Negroid

extraction, but 107 were Jewish. A total of 212, or 30.5 per cent., were found to be infected, and of these 110 showed favus and 102 trichophyta. The latter were most common between the ages of 5 and 10 years, whilst the lighter races were more affected than were the negroes. No lesions were ever found on the face, hands or nails. Of the 85 cases in which it was possible to make cultures 83 proved to be *T. violaceum* and 7 a fungus very similar to *T. glabrum*. Favus was mostly seen between the ages of 10 and 15 years. 27 cases only showing typical "cup." Cultures were obtained from 32 cases, all being *Achorion schönlleinii*. It is noteworthy that no instance of microsporum infection was detected.

M. S. T

CATANEI (A.) Les teignes du cuir chevelu chez les indigènes des environs d'Alger [Ringworm of the Scalp among the Natives near Algiers].—*Bull. Soc. Path. Exot.* 1929 Feb. 13. Vol. 22 No. 2 pp. 60-64 [1 ref.] [Pasteur Inst. Algiers.]

A total of 770 patients under the age of 16 years were examined, the work being carried out along the same lines as were adopted in Oran. Of these 80 were infected. 56 with trichophyta and the remainder with favus. No cases were observed below the age of 1 whilst 57 were seen between the ages of 6 and 10 boys being more affected than girls. Cultures revealed 4 *schönlleinii* or *T. glabrum* in the great majority of patients, but a few infections with *T. violaceum* and one with *T. sub-surfurum* were also found.

M. S. T

ACTON (Hugh W.) & MCGUIRE (C.) "Coochy Itch." A Purulent Folliculitis due to the *Trichophyton violaceum* Variety *Indicum*.—*Indian Med. Gaz.* 1929 May Vol. 64 No. 5, pp. 241-246. With 8 plates (3 coloured) [2 refs.]

This important article separates a clinical entity from the many forms of purulent dermatitis which have been carelessly designated "cochy itch." It is characterized by follicular pustules with surrounding induration and inflammation, this causing a peculiar purple coloration round each hair. There is marked irritation and secondary staphylococcal infection. The eruption is particularly common on the legs, but may affect all hairs except those of the scalp occasionally however it may even spread to these by extension from the beard. The authors have isolated a variety of *T. violaceum* which differs from the original only in cultural appearances. Full details are given of the methods of cultivation, morphology etc. The disease is common among lower class Indians and is spread very greatly by contact and friction, e.g. the cross rub of clothes and wrestling. Occasionally it is seen in seafaring Europeans who are accustomed to walking about decks barefooted. Frequent dressings with a 5 per cent. solution of gentian violet form an efficient treatment but in very indurated cases epilatory doses of X-rays may be necessary. The paper is amply and well illustrated.

M. S. T

- SARTORY (A & R.) MARCEL & MEYER (Jacques) Contribution à l'étude des mycétomes un nouveau cas d'actinomycose à grains jaunes [Actinomycosis with Yellow Granules.]—*C R Acad Sci* 1929 Mar 4 Vol 188 No 10 pp 745-747 [3 refs]

The case described is that of a young man who presented a painful and oedematous swelling of the tibia just below the anterior tubercle. Incision revealed a cavity filled with softened fragments of bone hard granulations and a yellow viscous fluid. Radiography showed an area of decalcification which might well be confused with tuberculosis. A full account is given of the histology staining and cultural characteristics of the organism found; it proved to be closely related to *Act. asteroides* and it is proposed to name it *var serratus*. Stress is laid on the fact that this infection occurred without any apparent involvement of the respiratory or intestinal tracts. Local and internal treatment with iodine compounds was completely successful.

M S T

- DELAMARE (G) & GATTI (C.) Mycétome du pied à grains blancs [Mycetoma with White Particles.]—*Bull Acad Méd* 1929 Feb 19 3rd Ser Year 83 Vol 101 No. 7 pp 273-278 With 2 text figs

The case which is very fully described in this paper definitely proves the existence of mycetoma in Paraguay. Stress is laid on the small size of the nodules and sinuses whilst the dorsum of the foot showed an inelastic band of brownish-black pigmentation suggestive of scleroderma.

M S T

- SILVESTRO (Lottico) Su due casi di mycetoma in Tripolitania [Two Cases of Mycetoma in Tripolitania.]—*Arch Ital Sci Med Colon* 1928 May Vol 9 No 5 pp 281-287 With 3 text figs [Inst. of Trop Path. Univ., Bologna]

The first was a man of 60 years with Madura foot. The condition had existed for a considerable time and secondary glandular involvement had occurred. Amputation was performed but the patient died. The second was a man of 55 years or so with a mycetomatous affection of the right hand [according to the text, but the photograph given is of the left hand]. This patient was seen earlier and operative measures proved successful.

H Harold Scott.

- DELAMARE (G) & GATTI (C.) La piedra del Paraguay [Paraguayan Piedra.]—*An Facul de Ciencias Méd* Asunción 1928 Aug & Oct Vol 2 No 7 & 8 pp 10-33 With 32 figs on 3 plates. [18 refs]

Piedra of Paraguay is due to a different *Trichosporon* from that of Colombia. That causing the Colombian form is *T. giganteum*. That of Paraguayan piedra is *T. hortae* but differs slightly from the type species in that the cysts possess 6-12 bodies in place of 8; it is therefore designated *T. paraguayi* although only a variety of *T. hortae*. Colonies grow more rapidly on Sabouraud maltose than on glucose and by the tenth day have a greenish periphery and the centre is mammillated.

H Harold Scott.

DELAMARE (G.) & GATTI (C.) Caractère *neoendothrix* de la *pedra* paraguayenne [*Neo-Endothrix Fungus in Piedra*.]—*C. R. Soc. Biol.* 1929 Jan. 18. Vol. 100 No. 2 pp. 122-124 With 6 text figs. [Med. Clinic, Faculty of Med., Asuncion.]

The authors state that by appropriate clarification of fair hairs from a case of *pedra* it is possible to see that the Paraguayan variety at least starts inside the cuticle and is due to a *Neo-endothrix* (Sabouraud). Full details of the microscopical appearances are given but the accompanying photographs are poor.

M. S. T.

CASTELLANI (Aldo) A *Pseudomyces* due to a *Coccus Micrococcus myceticus*.—*Arch. Dermat. & Syph.* 1928. Dec. Vol. 18. No. 8 pp. 857-861 With 2 text figs.

A complete account is given of all the features characteristic of this coccus. The morphologic, staining cultural and biochemical properties are included together with a table of its sugar reactions. Subcutaneous injection into rabbits produces a localized nodule which softens and later discharges pus. The first figure gives an excellent picture of the lesions produced in human beings. These are chronic suppurative areas with nodulation, sinuses and a centrifugal spread, at times suggestive of gummata. The only treatment which has so far proved efficient is a vaccine prepared from various strains of the organism.

M. S. T.

NEVES (Arceara) Onychomycose (?) por *Acrotheca Pedrosi* (Brumpt) 1921 [Onychia associated with "*Acrotheca Pedrosi*" (Brumpt) 1921].—*Brasil Medico* 1929 Jan. 19 Vol. 43 No. 3 pp. 66-70 With 1 text fig. [Oswaldo Cruz Inst., Rio de Janeiro.]

A man of 48 years suffering from onychia. *Acrotheca pedrosi* was cultivated on Sabouraud glucose and maltose but the author was unable to determine whether it was actually causative or merely a parasitic concomitant.

H. Harold Scott.

GIORDANO (M.) Di un caso di dermatomycosi da *Penicillium crustaceum*. [Dermatomycosis due to *Penicillium crustaceum*.]—*Arch. Ital. Sci. Med. Colon.* 1928. July Vol. 8 No. 7 pp. 367-400 With 1 text fig. [Inst. of Trop. Path., Univ. Bologna.]

A boy of 12 years born in the Sudan but living from a very early age in Tripoli, presented numerous pale areas scattered over the body but chiefly in the region of the ankles. They were rounded but with irregular margins, varying in size from that of a lentil to a two-lira piece. Culture on Sabouraud maltose yielded a *Penicillium* identified by Professor SACCARDO as *P. crustaceum*. Treatment with salicylic acid has greatly improved the condition and cure is expected.

H. Harold Scott.

GOMES (J M) & PERROA (Samuel B) Reprodução experimental da dermatite verrucosa. [Experimental Reproduction of Dermatitis Verrucosa.]—*Brasil Medico* 1929 Mar 9 Vol. 43 No 10 pp 255-257 With 6 text figs. English summary p 257 [Hyg Inst Sao Paulo]

In Brazil a dermatitis verrucosa is caused by the fungus *Acrotheca pedrossi*. Inoculations of dogs and rabbits with this organism produced warts at the second attempt— not at the site of injection but at a distance. The illustrations are poor

M. S. T

NEVES (Aroeira) Contribuição ao estudo da esporotricose familiar [Familial Sporotrichosis.]—*Brasil Medico* 1929 Jan. 26 Vol. 43 No 4 pp 92-94 With 4 text figs

Four cases are recorded occurring in the children of one family their ages were 7 9 10 and 12 years and the lesions small pustules were present respectively on the left upper eyelid, the right side of the face, behind the right ear and the front of the left arm. Cultivation on Sabouraud maltose gave a growth of *Sporothrix beurmanni*

H Harold Scott.

LANGERON (Jean) Notes sur l'ulcère phagédénique. [Notes on Phagedenic Ulcer.]—*Bull Méd du Katanga* 1928 Vol 5 No 3 & 4 pp 55-60

After reviewing the more common types of ulceration and treatment the author lays great stress on the fact that the necrosis may extend through the underlying fascia to muscle and may even involve periosteum and bone. It is then stated that the following treatment will cure an ulcer having a diameter of 16 cm. in about 91 days. This figure is contrasted with the 240 days required by other methods. The lesion is curetted and cleansed with 'Eau de Javal' (a chlorinated soda solution) and is then dusted over with a powder containing 2 per cent. of iodoform, 20 per cent. of calcium chloride and 78 per cent. of anhydrous sodium borate. A dry dressing is then applied. On the two following days the same process is repeated and the wound is by then quite clean. For the next fifteen days applications of iodoform in ether are used. This is succeeded by an ambrine dressing every eight days.

M. S. T

PUFF (Gerhard) Zur Behandlung des Ulcus tropicum Erfahrungen mit Desitin [Treatment of Ulcus Tropicum by Desitin.]—*Dermat Woch.* 1929 May 11 Vol. 88 No 19 pp 669-671 [4 refs.]

Several severe cases are described in detail, together with the various applications which were used. Apparently Desitin ointment proved successful on each occasion. Before it is applied the ulcer is washed thoroughly with an antiseptic lotion, e.g. $\frac{1}{2}$ per cent chloramine T. It is said to stimulate the growth of epithelium and has also been used with success in cases of burns and the ulcers of leprosy

M. S. T

CALLEWAERT WATSA. Un traitement simple et rapide des ulcères phagédéniques. [A Treatment for Ulcus Mollis Tropicum].—*Ann Soc Belge de Méd. Trop.* 1929 Mar 31 Vol. 9 No. 1 pp. 23-24

The ulcer is dressed with glycerine containing a 2.5 per cent. suspension of Iodoform and of dermatol. It is then covered with sterile gauze. Rapid sterilization occurs, the sloughs separate cleanly and healing immediately proceeds without interruption. Surgical intervention is only necessary when bone or tendons are involved.

M. S. T

ROX (D. N.). A Report on the Investigation into the Aetiology and Prevention of Naga Sore in Assam.—*Indian Med. Gaz.* 1928 Dec. Vol. 63 No. 12 pp. 673-687 With 2 charts & 4 figs. in text & 1 plate [36 refs.]

Like true *ulcus tropicum*, Naga sore spreads centrifugally with an undermined and infiltrated edge, the base of the ulcer being covered with a greyish-yellow slough. It has certain well-marked differences, however, in the first place there is no initial papular stage as the infection can only occur on a site of trauma involving a break in the continuity of the skin e.g. neck-bites, bamboo-scratches, etc. Lymphangitis, when it does occur, is only local. The disease is not contagious and confers no immunity. Exposed surfaces are the sites of election, particularly the lower parts of the legs. Whilst there is a certain epidermiology dependent on humidity, one tea-garden may be free whilst its neighbour is heavily infected. The spirochaetes and fusiform bacilli so often found are probably saprophytic only, whilst the exact relationship of a diplococcus found by the author is undetermined. Whatever the nature of the organism, however, there is little doubt that contamination of the initial wound takes place from the soil and is never fly-borne. An efficient preventive treatment is to paint all wounds with a mixture of tincture of iodine and Friar's balsam (proportions not stated) and then apply an occlusive dressing.

M. S. T

SMITH (H. S.). The Aetiology of Naga Sore. [Correspondence].—*Indian Med. Gaz.* 1929 Apr Vol. 64 No. 4 p. 239

In discussing soil contamination as the possible cause of the infection, the author draws attention to certain plantations where thorough cleansing of the feet in phenyl is efficiently controlled. Cases of "water sore" have decreased very markedly, yet there has been no appreciable effect on Naga sores. He points out that "the advent of the eye-fly and Naga sore are simultaneous."

M. S. T

DI LUIO (Orestes). Contribucion al estudio del pasaj. [Contribution to the Study of Pasaj, a Form of Dermatitis Venenata].—*Seminario Med.* 1929 Feb. 7 Vol. 36 No. 6 (1830) pp. 352-355. [1 ref.]

This condition (*ante* p. 109) was previously believed to be due to irritation by the pollen of *Quebracho colorado* (*Schinus molle*) but the author has shown by experiment that the poison is contained in the leaves at the time of florescence. By rubbing them on the skin, he

instillation of an alcoholic extract or an aqueous distillate the symptoms can be produced markedly with the first two mildly with the last.

The symptoms are intense local itching in the course of a few hours, with heat redness and swelling and later extension widely to the face and other parts of the body. These persist for several days and finally desquamate.

H. Harold Scott

PHOTIXOS (Théodore). Encore quelques considérations sur la maladie de Robert Lee (Creeping Disease) à propos de la publication de M. Cazenave. [*Thoughts on Creeping Disease.*]—*Ann Dermat et Syph.* 1928 June. 6 Ser Vol. 9 No 6 pp 488-507 With 15 text figs. [10 refs.]

The author recounts two published cases of creeping eruption that occurred in his experience in Greece—cases which he regards as typical illustrations of the disease first described in 1874 by Robert LEE. In one, the linear eruption began around the orifice of a fistula that resulted from the opening of an inflammatory tumour on the knee and thence crept, at the rate of 5-10 cm in 24 hours, all over the antero-internal surface of the leg and a considerable extent of the thigh. In the other it began in a raised patch of thickened and sodden skin surrounding the orifice of an umbilical fistula communicating with the intestine (a result of tuberculous peritonitis) and spread, sometimes at the rate of 1-5 cm but occasionally at the rate of 12-15 cm, in 24 hours until it had formed a dense labyrinth over the whole surface of the abdomen with extensive ramifications over the chest and left flank. The line of creep was for the most part red, but in some places vesicular sections showed that it lay sometimes in the corneous layer of the epidermis and sometimes between the corneous and Malpighian layers. The affection was not treated, but healed spontaneously in 40 days. Although parasites were not discovered the author has no doubt that the eruption in both these cases was due to larvae of the Oestrid fly *Gastrophilus*.

The author thinks but little of CAZENAVE'S zoogeographical classification (*infra* p 688) of the various kinds of creeping eruption, but prefers to distinguish two clinically-recognizable varieties of the creeping lesions caused by a variety of parasites. In the typical form of the eruption, caused by the larvae of the Oestrid fly *Gastrophilus*, the line of creep is filiform clear-cut erythematous or vesicular but not as a rule inflamed and the patient's symptoms are slight. In the non-typical variety caused by larvae of the Oestrid fly *Hypoderma*, or by larvae of various Nematelminthes the line of eruption is coarser more swollen, and inflammatory and the patient's symptoms are more severe the itching often being intolerable.

A. Alcock.

CAWSTON (F. G.) The Creeping Eruption, known as "Sandworm Disease" in Natal.—*Jl Med Assoc. South Africa.* 1928. June 9 Vol. 2. No. 11 p 300 [6 refs.]

— The Creeping Eruption of Natal known as Sandworm Disease.—*Jl Trop Med & Hyg* 1928. Aug 15 Vol. 31 No 16 pp 201-202. [7 refs.]

The author mentions divers wandering parasites—larvae of bot flies (*Gastrophilus* and *Hypoderma*) and of nematode worms—known to

CALLEWAERT WATSA. Un traitement simple et rapide des ulcères phagédéniques. [A Treatment for Ulcus Mollis Tropicum].—*Ann Soc Belge de Méd. Trop.* 1929 Mar 31 Vol. 9 No. 1 pp. 23-24

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sharply defined and has a raised pink and infiltrated edge which in turn is surrounded by an indurated erythematous-urticarial (*érysiatélaeuse*) zone. Under local antiseptic treatment these heal within three weeks. When untreated, severe local suppuration and gangrene may occur although the elimination of the dead tissue usually proceeds normally so that healing is complete in about five weeks. In all cases the corresponding glands are swollen and painful, the lymphatics themselves sometimes being reddened. In some cases small roseolar macules arise round the original lesion and may even spread up the leg and on to the lower abdomen. Slight fever is then usually present for two or three days only.

The histology first shows proliferation and oedema of the mucous layer with inflammation and mononuclear infiltration of the dermis. Vesiculation soon appears deep in the mucous layer and local cellular necrosis occurs rapidly. At this stage it is seen that the papillae are very congested, whilst the greater number of the invading cells are seen to be polymorphonuclears with a few irregularly distributed groups of eosinophils. Usually the destruction descends only as far as the papillary layer—it never reaches the subcutaneous tissues.

The acute inflammation and lymphangitis suggest a microbic cause but direct examination of serum etc. attempts at culture and the inoculation of material into rabbits and guinea-pigs have all proved inconclusive although possibly suggestive of a streptococcal infection. Inoculation of monkeys (*Cercopithecus*) was successful, whilst glands removed from them showed the usual changes consequent on inflammation only.

Those patients who suffered from more than one lesion showed them in the same stage of development and auto-inoculation was never seen. In a case where a husband apparently infected his wife the incubation period was 13 days. The fact that the papules are always on exposed surfaces leads to the consideration of the implication of biting insects. All the cases occurred during the rainy season of March, April and early May.

It is considered that this disease is a new entity although somewhat similar to Ecthyma, *Dermatitis pratensis* and *Dermatitis cupuliformis*. Stress is laid on the acute onset, the histology, the circular and superficial ulceration, the roseolar rash and the site together with the seasonal incidence and the absence of auto-inoculation.

M. S. T

CASTELLANI (Aldo) & DUVAL (Charles W.) *Dermatosis Papulosa Nigra*.—*Arch Dermat & Syph* 1928 Sept. Vol. 18 No 3 pp 393-395 With 4 figs. (1 coloured) [1 ref.] [Trop & Path. Depts Tulane Univ New Orleans.]

This disease is common among the negroes of Jamaica and Central America and has been seen in Louisiana. The papules appear on the face soon after puberty and are black, cupuliform or slightly flattened and have a diameter of 1-5 mm. At first they are smooth later often roughened, whilst they are neither pruriginous nor painful. The condition gradually becomes more marked but does not influence the general health of the patient in any way. The cause is unknown and only destructive methods of treatment are efficient. The article is well illustrated.

M. S. T

SPITTEL (R. L.) & FERNANDO (S. E.) A Case of Elephantiasis Neurotica.
—*Brit. Med. J.* 1929 Mar 30 pp. 596-597 With 4 text figs

This case occurred in a male Tamil, aged 20 years, and demonstrates the close relationship between this affection and molluscum fibrosum very clearly. "The fibromatosis of the cutaneous nerves merges into a diffuse overgrowth of the skin and subcutaneous tissues." The left leg of this patient weighed 35 lb out of a total body-weight of 100 lb. There was marked increase in the lengths of the tibia and fibula, whilst dissection of the amputated limb also showed great enlargement of the periarterial sympathetics. The condition is said to have been present at birth and to have progressed with the growth of the boy. At the time of examination both the patient and his mother bore the generalized tumours and pigmentation characteristic of molluscum fibrosum.

M. S. T

HILL (R. C.) A Case of Antrum.—*New Orleans Med & Surg J.* 1929 Jan. Vol 81 No 7 p. 509

A typical case affecting the fifth digits of both feet only the patient being a negro resident in Alabama. The account only covers the clinical picture and history.

M. S. T

MICHAEL (Jeffrey C.) Erythematous Dermatitis from Acetarsone (Stovaine).—*Jl. Amer. Med. Assoc.* 1929 Feb 23. Vol 92 No. 8 pp. 843-844. With 2 text figs. [1 ref.]

REVIEWS AND NOTICES

Dew (Harold R.) [M.B. B.S. F.R.C.S. (Eng.) F.A.C.S., etc.]
Hydatid Disease. Its Pathology, Diagnosis and Treatment.—
429 pp. With 87 illustrations. 1928. Sydney. The Australia-
Asian Medical Publishing Company Limited. [27s. 6d.]

As stated in the preface by Mr H. R. Dew this book marks the culminating point in a series of researches on the biology, pathology and diagnosis of hydatid diseases carried out at the Walter and Eliza Hall Research Institute Melbourne. From this aspect, as also in point of time its publication is opportune since no Australian monograph has appeared on this subject since THOMAS's classical work in 1894.

After a short historical introduction the author reviews in the earlier chapters the life history and the chief morphological features of *Echinococcus granulosus*. As in other countries, the dog constitutes the chief definitive host, but the probability of dingoes and foxes being implicated is also considered. It is interesting to note that neither animal has yet been shown to harbour this parasite in Australia. Dogs become infected by feeding on the lungs and livers of infected sheep while man contracts the disease from ova deposited in canine excreta. The valuable work of Clunies Ross on the incidence of hydatid in Australian dogs is epitomized and the author concludes that man is generally infected by direct contact and less frequently through contaminated water and infected vegetables. Owing to their earthy habits children are especially susceptible. The geographical distribution in different countries is considered in a separate chapter and an instructive correlation between the sheep population and the incidence of echinococcosis in man is shown. Compulsory destruction of all cyst-bearing viscera is advocated as a sound prophylactic procedure.

Chapters IV and V deal admirably with the development of the cystic stage in the intermediary host, including brood capsules and scolices and here as elsewhere numerous original plates illustrate the text. The vexed question of daughter cyst formation is considered at length. Surgeons have long noted that at operation the mother cyst is generally degenerated when endogenous cysts are present, and this observation led MACCORMICK and later DIXON to develop the theory that endogenous daughters arise as a defensive reaction to factors inimical to the existence of the parasite. Mr Dew ardently supports this view and brings forward from different angles much clinical and pathological data considered to have a bearing on the subject. The reviewer feels that this intellectually satisfying and widely accepted theory would rest on a surer biological foundation had the earlier phenomena of daughter cyst formation been studied in short-lived hosts. The author also denies the intracuticular formation of daughter cysts and has put forward original views regarding the origin of both endogenous and exogenous varieties. The former are held to arise mainly from endocyst and brood capsules, the latter as external herniations of both layers of mother cyst through weaknesses in the adventitia. Neither theory however is receiving support from contemporaneous workers and it appears unlikely that they will find so prominent a place in subsequent editions.

The section on pathology deals with cyst distribution and the effects of degeneration and other secondary changes in modifying the course of the disease. Primary lung and liver cysts occur in 80 per cent of cases and the incidence of intracranial cysts is higher in children than in adults. Rupture may be followed by hydatid anaphylaxis or secondary echinococcosis, while infection introduces an additional element of sepsis. Death of the parasite with absorption of fluid, collapse of the cyst, shrinkage, fibrosis and calcification may follow either of these complications. Since the application of serological methods by different workers at the Walter and Eliza Hall Institute the pre-operative diagnosis has improved from

43.7 to 93 per cent. of cases. Eosinophilia is found in 33 per cent., precipitin reactions in 65, complement fixation reactions in 60, and primary whealing following the intradermal injection of hydatid fluid in 90 per cent. of patients. X-rays prove of special value in determining the anatomical location of a cyst.

Sixteen chapters are devoted to the diagnosis, complications and treatment of visceral hydatids. It is pointed out that differentiation between cysts on the upper surface of the liver and the base of the lung may be made more difficult by pleural effusion. Radiography here proves of special value. The use of the trochar is not advocated, as aspiration may be followed by sudden flooding of the bronchial tree with hydatid fluid.

Medical treatment has proved valueless and operative procedures are varied according to the type and the anatomical location of the cyst and the presence or absence of complications. Great care is taken to prevent secondary infection and soiling of the tissues with cyst contents. Pure formalin is injected into univascular cysts but this procedure is considered of little use when daughter cysts are present. The treatment of the adventitious cavity varies. Sometimes it is filled with normal saline before being sewn up; at other times it is manipulated or drained. Operative interference in calcareous cysts is deprecated.

The volume closes with a well reasoned chapter on *Echinococcus alveolaris*, many features of which are explained in terms of an abnormal host reaction to *Echinococcus granulosus*. Its value would have been enhanced by photomicrographs illustrating the transition forms described in the text.

From many viewpoints Mr. Dow's book is an admirable production. It is a well-balanced and practical presentation of a difficult subject and should prove of the greatest value to physicians and surgeons in all countries where hydatid disease is endemic.

Excellent illustrations and clear type are among the many attractive features of this authoritative monograph and reflect much credit on the publishers.

N. Hamilton Fairley

REICHEKOW (Ed.) (Abteilungsvorsteher am Institut für Schiffs- und Tropenkrankheiten in Hamburg) & WILKER (Gerh.) (Privatdozent für Zoologie an der Universität Frankfurt a.M.). *Leitfaden zur Untersuchung der tierischen Parasiten des Menschen und der Haustiere.* (Zugleich Neuauflage des gleichnamigen Leitfadens von Braun und Lübb.) (Key to the Examination of the Animal Parasites of Man and Domestic Animals.)—pp. vii+235. With 104 text figs. 1929. Leipzig: Curt Habichtsch-Verlag. [Broch. Rm. 20 gebunden Rm. 22.]

This book can be recommended to senior students who wish to refresh their memories of the various technical methods used for the examination of the animal parasites of man and the domestic animals. It is not a suitable book for beginners. All the methods recommended are good ones, but, except in the case of the worms, they are not described in much detail, and little or nothing is said about the many possible causes of failure. It is certainly convenient to have collected in a small volume, so many of the essential facts about animal parasites, but it is scarcely possible for the authors to do justice to the subject, or to themselves, in 235 pages of large type, especially as so much of the limited space is occupied by illustrations. The first hundred pages or so are devoted to the Protozoa, which are considered rather thoroughly but, in a book of this kind, a long differential table of the Entamoebae and full-page illustrations of the life-histories of *Harmogregarina* and *Plasmodium* take up more room

than can be spared. About another hundred pages are given to the Helminths the treatment of these is a much more general one and therefore more useful, than that of the Protozoa. It is impossible to deal adequately with the Arthropods in the 24 pages which remain. There are more than a hundred excellent illustrations, almost all of which are reproduced from well-known works, and there is a good index.

H J Walton.

SERGEANT (Edm & Et) & PARROT (L.) *La découverte de Laveran.* Constantine 6 novembre 1880 [*Laveran's Discovery Constantine, 8th November, 1880*]-48 pp With 22 figs 1830-1930 Collection du Centenaire de l'Algérie Etudes scientifiques. L oeuvre médicale de la France en Algérie. 1929 Masson et Cie. Editeurs: 120 Boulevard Saint-Germain Paris VI

In 1930 France celebrates the centenary of the colonization of Algeria, a country in which, in 1830 there existed no knowledge of medicine and no ideas of sanitation. The chief method of treatment was by verses of the Koran written on fragments of paper that were swallowed or worn as charms. Surgery such as it was, was still practised by the barber. France claims to have caused a revolution of improvement during the past hundred years by means of the soldier the engineer the colonist and the doctor of medicine who often at the cost of his life brought to the native population, either in military or civil surroundings, the benefits of medical and surgical art. *La Découverte de Laveran* forms part of a series of small volumes dealing with the political and economic conditions of Algeria the geography geology botany zoology etc. of the country and the medical work of France in Algeria. In chapter I the editors consider the various theories as to the etiology of malaria prior to LAVERAN's discovery. They mention unknown animalcules of VITRUVIUS and others which rising from swamp putrefaction entered the blood of men telluric emanations were suspected and in the nineteenth-century LANZI & TERRIGI (1876) put forward as a cause of ague *Bacteridium brunneum* and this was followed (1879) by the *Bacillus malariae* of KLEBS & CRUEL. But as we know these bacilli did not respond to the necessary tests and conditions. Malaria was very common in Algeria and wrought much havoc among the troops and the colonists and it was essential that something more should be known as to its causation. In August, 1878 Major Alphonse LAVERAN who had been acting as a professor at Val-de-Grace was sent in the ordinary course of military transfers to Constantine in Algiers. While there, and also at Bone and Biakra he devoted himself to the study of malaria. Beginning with the histology of the tissues he found pigment and pigmented bodies in the blood etc. Whence did they come? The dead bodies did not answer the question so LAVERAN turned to the living and examined the fresh blood of cases of malaria. He found round pigmented bodies and leucocytes charged with pigment. He wrote "I had for some time suspected that these elements were of parasitic origin, when on the 6th November 1880 while examining a round and pigmented body in a preparation of fresh blood, I saw with astonishment that there existed at the periphery a series of thin filaments very transparent which moved with great agility and of which the animate nature was incontestable. Thus was LAVERAN led to the discovery of the Plasmodia of malaria which in his original paper (*Comptes Rend de l'Acad des Sci* October 1891) he named *Hamameba malariae* and depicted on a plate which is shown with his manuscript. The illustrations contain two portraits of LAVERAN and several photographs of Constantine

J H Tull Walsh

ERRATUM.

Vol. 26 No. 6 p 504 (Tropical Ophthalmology)¹ Second line of
fourth paragraph. For China read Japan.

TROPICAL DISEASES
BULLETIN

Vol. 28.]

1929

[No. 9

SLEEPING SICKNESS.

MACLEAN (G) *A Report on Human Trypanosomiasis in Tanganyika Territory for the Year ending 31st December, 1927 — Tanganyika Territory Ann Med & San Rep for Year ending 31st December 1927* pp 129-138.

The infected regions of the Territory are still divided into the five following separate areas —

- (1) The Maswa Ucoma area Mwanza Province.
- (2) The Tanganyika Lake Shore area; Kigoma Province
- (3) The Ufipa Tabora area; partly in Kigoma and partly in Tabora Province.
- (4) The Liwale area Lindi Province.
- (5) The Rovuma area; partly in Lindi and partly in Mahenge Province

During the year the only serious spread occurred in the Ufipa Tabora area, where the disease appears to be making progress northwards. In a table the number of new cases discovered during 1927 and the number of deaths recorded are given in respect of each of the five areas. In all, 360 new cases were found and 148 deaths occurred during the year. In addition it is noted that 22 deaths took place during 1926 but were not recorded until 1927. With the possible exception of Southern Ufipa, all the available evidence points to a man-fly-man spread and even in Ufipa it is not necessary to assume the existence of a vertebrate host other than man. On the other hand the author adds that it is not suggested that non-human vertebrate hosts have been excluded, or that they may not be an active epidemiological factor. Examples are given in support of these contentions.

The next section of the report describes in detail the general sleeping sickness policy and the text of the Memorandum, dated August 22nd, 1927 the general principles of which have been approved, is given in full.

Turning to treatment, the author states that the results obtained with the 1924 and 1925 cases formed the subject of a later report.

In Rhodesian cases it was found that Bayer 205 alone does fairly well in early cases and in cases whose general symptoms are chronic or slight. Probably the best prognostic criterion is the condition of the cerebrospinal fluid after a course of treatment. A cell count of 30 or less per cmm appears to be a good prognostic sign and an indication that treatment may cease. Fournieu 309 was used in a very limited number of cases with apparently the same results as with Bayer 205. Try-

parasamide alone has given good results in a few cases, but the general verdict is that it is unsatisfactory. Combined Bayer and trypanamide treatment is now on trial and the results obtained suggest that, provided treatment is commenced with Bayer 205 the combination is more effective in the average case than with either drug singly.

In *pombe* cases it is impossible to record this year any observations of value.

An account is next given of the situation in the sleeping sickness areas. In Maswa Ikoma area the extent of country known to be infected was considerably increased during the year. This may be a genuine spread, but is more likely to be the gradual unravelling of the situation. In the Tanganyika Lake Shore area, the situation has remained unchanged. In the Ufipa Tabora area a new outbreak—probably a spread from known foci though this has not been established—was discovered about forty miles north west of Tabora towards the end of the year. The outbreak is serious in that it strikes at an important labour supply area. The only measure carried out so far is the treatment of patients. A resettlement scheme will be put forward as soon as the necessary agricultural information is available. In the Liwale area the most interesting point was a recrudescence of the incidence of the disease in two circumscribed regions, which were well known to the Medical Officer Dr DYE. [See this Bulletin Vol 25, p. 531.]

The general preventive measures adopted are the segregation and treatment of all infected cases and the clearing of scrub around villages, particularly infected villages, so as to make them fly-free. No cases were reported from the Rovuma area during the year but there is no reason to believe that the disease has died out and had staff been available for the survey there is little doubt cases would have been found.

W. York.

MACLEAN (George) The Relationship between Economic Development and Rhodesian Sleeping Sickness in Tanganyika Territory.—*Ann. Trop. Med. & Parasit.* 1929 Apr 26. Vol. 23, No. 1 pp. 37-46. With 1 diagram & 1 map [3 refs.]

The following summary is given —

"Before the days of European domination the people of Tanganyika Territory lived for the most part under conditions which made it difficult for Rhodesian sleeping sickness to get a firm footing.

"The freedom that followed the coming of the European resulted in the evolution of a type of bush family village which became a danger to health because of the close contact between man and tsetse that it made possible.

"Some of the old large settlements shrank to the dimensions of these villages from various causes the chief of which were the disturbances produced by the Great War and the re-distribution of population that has resulted from the opening up of the country.

"The situation can be met by encouraging native agriculture where this can profitably be done. In places so remote that successful development is problematical the people can be collected in settlements large enough to be safe from extinction by trypanosomiasis. The people in these settlements have a tendency to drift towards places where better conditions prevail. When this takes place on a large scale the dwindling settlements will have to amalgamate for self-protection, a process of gradual and orderly evacuation will have set in, and continue unless some local attractive source of wealth is discovered to turn the tide.

Once the bush village is compulsorily eliminated it should be possible for reclamation and evacuation to go on in an orderly fashion, as the exigencies of the general situation demand. It should also be possible for native and non native enterprise to go on with no more antagonism than a legitimate rivalry for labour and for markets.

W Y

CORSON (J F) *Sleeping Sickness in the Ikoma District of Tanganyika Territory. Notes on Some Cases treated by Professor F. K. Kleine*—*Ann Trop Med & Parasit.* 1928 Dec. 28. Vol. 22. No 4 pp 379-417 [15 refs.]

The cases referred to were, for the most part suffering from Rhodesian sleeping sickness and were treated by KLEINE between September 1926 and May 1927. Corson continued the work on more or less similar lines during the following five months and from October 1927 to June, 1928 he was succeeded by Park NOBLE. The principle of treatment was the combined use of germanin with preparations of arsenic and antimony. Before discussing the cases, the author refers briefly to certain associated conditions. Amongst the other diseases prevalent were malaria, relapsing fever and, probably syphilis. Helminth infections were very rare. Game animals were abundant throughout the area all the year round. Two species of Glossina were present viz. *G. swynnertoni* and *G. pallidipes* the former being much the more numerous. Tsetse are as a rule rarely encountered in the valleys, and large numbers of cattle, sheep and goats are kept. The people are well-nourished they are much addicted to hunting and make farms in the bush at considerable distances from their villages. Their customs bring many natives into close contact with tsetse under conditions favourable to the transmission of sleeping sickness.

The author considers that the natural duration of the disease in untreated cases is about six months to a year. He knows of no case of natural recovery. Diagnosis was chiefly made from stained thick blood films, and in nearly all cases trypanosomes were easily found at the first examination. The author states that he was not always able to be sure of the infection of the central nervous system from clinical signs unless these were very definite. Weakness and wasting may develop very quickly in Rhodesian sleeping sickness.

Most of the patients presented the clinical picture of an acute illness with considerable wasting and weakness, some fever headache, general body pains, and enlargement of the lymphatic glands. Localized swelling or oedema was present in a few cases. As many patients on temporary recovery were allowed to visit their homes re-infection could not be absolutely excluded. Tsetse were rarely seen in the precincts of the hospital. In a table it is shown that parasitic blood relapses nearly always occur within a few months of the cessation of treatment, and sometimes during treatment. They were almost always associated with symptoms.

Writing on the effects of the drugs used, the author states that the general experience is that there is no drug which can be compared in value with Bayer 205 in the treatment of early Rhodesian sleeping sickness and he adds there seems to be no reason why a white person should, in future, die of the disease. Natives however unfortunately usually come for treatment in a later stage. The question whether Bayer 205 acts beneficially on the infected nervous system is very

important. Much has been written suggesting that it does not, and reference to the author's protocols shows that some of these cases have died and many have relapsed after a course of treatment that would be regarded as very thorough in early cases. On the other hand, the progress of certain cases suggests that the drug has an effect, direct or indirect, on the infection of the central nervous system. At any rate, it appears to reduce the virulence of the trypanosomes at least for a long time.

Trypanamide has not given results in any way comparable with the success gained for it in *T. gambiense* infections. In previously untreated cases it failed to cause trypanosomes to disappear from the peripheral circulation sometimes after the administration of a considerable number of doses. The general conclusion reached is that this drug should be used in succession to and not instead of, Byer 205

"BR68. This is a preparation of arsenic made by Bux and Rârs. It is stated to be one of a number of preparations in which arsenic is combined with pyridin or chinolin groups. The drug was given intravenously in two relapsed cases. The clinical effects and action on the blood were good, but in one of the cases it did not appear to influence the infection of the central nervous system.

Various antimony preparations, such as stibosan and antimosan, were not found to be very satisfactory. Details of the cases treated are given in tables.

W Y

TROLLI (G.) La trypanosomiase au Congo Belge en 1927 [Trypanosomiasis in Belgian Congo in 1927]—*Bull. Office Internat. d'Hyg. Publique* 1929 Feb. Vol. 21 No. 2. pp. 235-303. With 1 map

The author gives an account of the present position as regards sleeping sickness in the Belgian Congo. The results of examination of large numbers of the population in the various provinces are summarized in the following table —

	Examined.	Parasitised.	New Cases.	Old Cases.	Total on treatment.
Prov. Congo-Kasaï ..	1 063,516	123,812	14,530	59 608	31 49*
Province Equateur	180,523	21 731	1,533	4,068	3,366
Province Orientale	213 788	47,290	362	5 193	5,621
Province Katanga	168,014	2,500	1,333	800	2,349
Terr. Ruanda Urundi.	80 633	3,347	1,268	1,378	2,544
Total	1 704 477	193,670	16,280	70,940	45,359

At Lusanga the itinerant medical service composed of a doctor and a sanitary agent have examined 82,572 persons and found 63 patients and two in the sleeping sickness stage. These figures must be added to those of the total above. The patients on treatment, roughly 45,500 referred to in the table are really those on treatment at the end of the year. They comprise the new cases and the old cases subjected

to a second or to a third course of treatment. At the end of three months a certain number of cases enter their rest period and are replaced by others who have finished their period of rest. By this means, with cases diagnosed recently approximately the same numbers of patients are on treatment all the year round. A summary is given of the situation in the various divisions of the Provinces. The summary is mainly statistical and should be consulted by those interested. Fourteen cases of the disease were diagnosed amongst Europeans—six at Katanga in the Tanganyika Moero District and eight in the Province of Congo-Kasai of which six were at Leopoldville West one at Bas-Congo and one at Kwango. In addition two cases were found among the missionaries at the Swedish mission on the north Cataracts. None of these patients have died. It is universally agreed that trypanamide should replace old methods of treatment. There is no more efficacious method of treatment at the moment and this fact is fully recognized by the natives. Financial problems prevent its general use. The question of the re-opening of the old lazarets also arises examination of the cerebro-spinal fluid and the admission to hospital of all cases exhibiting pathological changes in the fluid are necessary

W Y

LAENET L'organisation de la lutte contre la maladie du sommeil dans les colonies françaises de l'Afrique [Organization of Anti-Sleeping Sickness Measures in the French African Colonies].—*Bull. Office Internat. d'Hyg. Publique* 1929 Feb Vol 21 No 2. pp 279-284

In the French African Colonies sleeping sickness exists (1) In Equatorial Africa in the greater part of its extent from the coast up to Fort Lamy along the banks of the Chari. (2) In the Cameroons in the basins of the Haut Nyong and the Doumé. (3) In Haut Togo. In West Africa a number of other circumscribed foci have been known for many years in particular in the Senegal and Casamance and in Guinea. These do not appear to extend.

The author then passes to a consideration of the organization of sleeping sickness services. He states that in the Cameroons this consists of an autonomous mission comprising 10 doctors 20 European sanitary agents and 300 native assistants. In Equatorial Africa the service has been reorganized in the form of a mission consisting of 11 doctors, 1 veterinarian, 10 hygienists 12 European sanitary agents and 105 native assistants. In Togo the situation has not necessitated the creation of a special mission. A doctor with a number of native assistants deals with situations in the various parts of the colony. A statement of the expenditure devoted to trypanosomiasis in the various colonies during the past few years is set forth in a table. The prophylactic measures adopted are three-fold.

(a) Administrative measures relating to the carriers of the virus this is called medical prophylaxis

(b) Destruction of the haunts of Glossina this is known as agronomic or administrative prophylaxis.

(c) The treatment of the sick. Details are given of each of these lines of action.

W Y

SUDAN Report on Sleeping Sickness by the Principal Medical Officer, Sudan Defence Force for the Periods 1st October, 1926 to 31st December, 1926 and from 1st January 1927 to 31st December, 1927 [MAURICE (G. H.) Acting P.M.O.]—*Rep. on Med. & Health Work in the Sudan for the Year 1927* pp. 29-32.

In a table the admissions into hospital for sleeping-sickness from Mongalla and the Bahr El Ghazal during each of the years 1909-1927 are given. The figures show that sleeping sickness is no longer epidemic in the Sudan. Only 33 cases were found in Tembera as against 839 in 1923. A very brief account is given of the situation in each of the sleeping sickness districts. The author states that the situation can be summed up as follows —

- "1 Sleeping Sickness is under complete control in the Sudan.
- "2 The people throughout the fly areas are closely administered and situated in villages inimical to sleeping sickness. Therefore, a serious epidemic is unlikely to occur again ever provided inspections are regular.
- "3 The disease could quite easily be stamped out definitely if there were not heavily infected countries along 1 000 miles of Sudan frontier.
4. Things being as they are the complete eradication of sleeping sickness from the Sudan is impossible and a close watch has to be kept to detect local outbreaks.
- "5 If local outbreaks are not detected an epidemic will result.
6. Since a considerable staff has to be employed to detect local outbreaks some relaxation of existing regulations at the present time is permissible but only because adjoining countries make permanent eradication impossible.
- "7 The staff, employed primarily for sleeping sickness, is by no means confined in its activities to sleeping sickness, but is able effectively to deal with many diseases, which in other circumstances would take a heavy toll of the population."

W Y

HOFFMANN (C. C.) [Kurze Beschreibung eines vermutlichen Übertragers der menschlichen Trypanosomiasis im Staat Veracruz.] [Short Description of a Probable Vector of Human Trypanosomiasis in Vera Cruz.]—*Rev. Mexic. de Biol.* 1928. Vol. 8. [Summarized in *Arch. f. Schiffh. u. Trop. Hyg.* 1929 May Vol. 33 No. 5. p. 304.]

The author believes that *Conorrhinus dimidiatus* Latr. is possibly an invertebrate host of *Trypanosoma cruzi*. The insect extends as far as 20° N. in Mexico but only in the eastern portion of the country. Two sub-species are found, viz. *C. dimidiatus dimidiatus* Latr. and *C. dimidiatus maculipennis* Stal. Hitherto only the latter has been recognized as an ectoparasite of man. The district of Vera Cruz is not very different from those in which Chagas disease is found. *Derophae nocentulus* Latr. and *Didelphys virginiana* Kerr are also found at Vera Cruz. However no definite case of trypanosomiasis has been recorded in Mexico. Probably this is due to the fact that both insects live in the woods and are parasites of wild animals and are not yet adapted to man. In inhabited regions *C. dimidiatus* is rarely encountered. Developmental forms of the trypanosome are met with in the insects, but have never been found in man.

On the contrary *C. dimidiatus maculipennis* was found by the author in clefts in the walls of old houses in Vera Cruz. In this situation they are apparently well adapted to man and bite frequently at night.

W Y

JOHNSON (W B) & LESTER (H M O) The Value of the Adhesion Phenomenon in estimating Wild Game "Trypanosome Reservoirs" and as an Aid to Diagnosis in Human Trypanosomiasis.—*West African Med J*. Lagos. 1929 Jan. Vol. 2. No 3 pp 144-156 With 1 chart [6 refs.]

Acting on the suggestion of DAVIS and BROWN, 1927 the authors have examined the value of the adhesion phenomenon in estimating wild game-trypanosome reservoirs and as an aid to diagnosis in human trypanosomiasis. An account of the technique is given. The trypanosomes used in the experiments were *T. brucei* (strains B and C obtained from wild *Glossina morsitans*) *T. gambiense* (strain C obtained from a case of human trypanosomiasis) and *T. congolense* (strain D obtained from wild *Glossina morsitans* and strain E obtained from a naturally infected dog)

Preliminary experiments confirmed the specificity of the adhesion phenomenon in animals immunized against trypanosome infections. The reaction did not occur in animals naturally non-susceptible to a strain of trypanosomes when tested against this strain. For example 32 human sera tested against *T. brucei* all gave negative results. Human and rat sera tested against *T. congolense* also gave negative results. Application of the test to animals showing chronic infection of trypanosomes gave positive results

The reaction has been obtained in the blood of wild game when tested against *T. brucei* and *T. congolense*. The test is thus likely to be of value in estimating trypanosome reservoirs and may throw light upon the nature of the game immunity to trypanosomes. It may be of value in distinguishing between game infective and human infective strains of trypanosomes and in determining the part played by animal hosts as reservoirs of sleeping sickness. The authors consider the test should also be effective for demonstration of chronic trypanosome infection in cattle sheep and goats, etc. in which it is known that such infections may lie dormant for considerable periods until adverse conditions reduce the animal's resistance and cause the disease to assume a suddenly acute and fatal form.

Two hundred cases diagnosed as sleeping sickness were tested against *T. gambiense* by the adhesion test. As controls three African cases of syphilis and seven normal European bloods were used. All the controls gave negative results. Sixteen cases of human trypanosomiasis which gave positive results against *T. gambiense* were also tested against *T. brucei* and gave no reaction. Details of all the cases tested are shown in a table. The cases were grouped as follows —

- | | | |
|-------|-----|------------------------------------|
| Group | I | Before treatment |
| | II | During treatment |
| | III | Within one year after treatment. |
| | IV | From 1 to 3 years after treatment. |
| | V | From 3 to 5 years after treatment |

Group I—Of these 31 cases gave positive results 3 were doubtful and 6 were negative. Of the 6 negative cases 5 have been diagnosed on clinical signs only and the diagnosis was probably incorrect, but one had trypanosomes in the gland juice. Limiting the observations to the 30 cases of this group which had been proved microscopically to be sleeping sickness it was found that 90 per cent. were positive 6.7 per cent. were doubtful, and 3.3 per cent. were negative

Group II—Of the cases in this group 39 gave positive results, 2 doubtful, and 5 negative. Of the 37 cases proved positive microscopically 86.5 per cent. gave positive reactions, 5.4 per cent. were doubtful, and 8.1 per cent. were negative.

Group III.—51 cases belonging to this group gave positive reactions, 2 were doubtful and 8 were negative. Of the 51 cases proved positive microscopically 84.6 per cent. gave positive reactions 3.8 per cent. were doubtful, and 11.6 per cent. were negative.

Group IV—In this group 27 cases gave positive results, 8 were doubtful and 19 were negative. Of the 45 cases proved microscopically to be infected before treatment, 57.8 per cent. gave positive reactions, 15.5 were doubtful, and 26.7 were negative.

Group V—Only 5 cases in this group were available and all had been proved microscopically to be infected before treatment. One gave a doubtful reaction and the remainder were negative.

The authors consider that the test is of real value for diagnosis in human trypanosomiasis. The reaction gradually disappears after a varying period following infection and treatment. It is suggested that the test is an indication of acquired immunity and that, as this is lost, re-infection may occur. It is considered that the test is more reliable than the formol-gel test in cases of human trypanosomiasis.

W Y

MÜHLENS (P) Trypanosomiasis bei Mutter und Säugling. [Trypanosomiasis in Mother and Suckling.]—*Arch f Schiff's u. Trop Hyg* 1929 Mar Vol. 33. No 3 pp. 181-187 [7 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

A detailed account is given of the medical history of a mother and infant, both of whom suffered from trypanosomiasis. The mother was presumably infected in Angola at the beginning of 1925. She left for Germany in May 1925. No parasites were found, however until October. The patient remained in good condition. From November 6th to 10th she was given a course of 4 gm. of germanin. A short time afterwards she had a nasal operation followed by erysipelas and then a relapse of trypanosomiasis. A second course of germanin was given. She returned to Africa in April, 1926, and on the voyage had fever and was given an injection of 1 gm. of germanin by the ship's doctor. Shortly after her arrival in Africa she had further fever with erythema and great loss of weight. No information is available regarding her further treatment but it is known that in the third stage of sleeping sickness, she had injections of germanin shortly before her death which occurred 12 days after the birth of a child on October 19th, 1927.

The medical record of the child shows that on November 6th, 1927 it was very anaemic, in poor condition and suffering from periodic attacks of fever. A blood film was examined, but no trypanosomes were seen. Notes made on various other occasions between this date and April 8th, 1928 when the infant left for Germany record attacks of fever erythemas, and oedemas. Enlargement of the cervical lymph glands was first noticed on February 21st, 1928.

On admission to hospital at Hamburg a few trypanosomes were found in the blood, the temperature was normal, the weight was 6.5 kgm. and the general intelligence and development satisfactory. There was no enlargement of the lymphatics and the internal organs were normal.

On May 5th 1928 a course of treatment with germanin was commenced. The child apparently did well until the end of October but in November it was taken ill and admitted to hospital at Leipzig with pronounced nervous symptoms. It was treated with tryparsamide and died suddenly on January 19th, 1929.

The author reviews the evidence relating to the question whether this was a case of congenital infection and concludes from the available facts that it probably was.

W Y

GRAF Beitrag zur Pathologie des *Glossina palpalis* Sticks und der Inkubationszeit bei Schlafkrankheit. [Pathology of *Glossina palpalis* Bite. Incubation Period in Sleeping Sickness.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1929 Apr Vol. 33. No 4 pp 219-222.

On November 18th 1928, the author in the Cameroons was consulted by a patient who complained of a boil. On the left side of the face directly under the ear was a round inflamed area about 3 cm. in diameter in the middle of it was a red spot almost 1 cm. in diameter surrounded by a waxen zone about 3-4 cm. in breadth having the appearance of a confused mass of minute vesicles and thus again was surrounded by a red zone the surrounding tissue was swollen. The lesion itself was hard and felt like a button embedded in the tissues and was very painful. The temperature was 39° C. and the pulse 100. The patient stated that the trouble started two days previously as a small pimple the following day he had a temperature and a slight rigor and the pain was greater. During the evening of November 17th the symptoms became remarkably increased in severity.

The patient himself considered the lesion to be a boil, and did not remember being bitten by an insect, but another European recalled its striking similarity to the tsetse bite in a European (FELDMANN) in the same area two years previously who subsequently developed trypanosomiasis.

The author punctured the inner margin of the white zone and in a stained preparation found numerous trypanosomes. The two following days trypanosomes were again found in the lesion. It is important also to note that on the last occasion, i.e. only four days after the commencement of the lesion, trypanosomes were found in the finger blood. The patient was treated immediately with Bayer 205 with the result that the lesion at once subsided.

On November 23rd, the author was consulted by another patient who had heard of the previous case and who had 28 days previously been bitten by a tsetse on the right temple. The lesion was slightly red and painful, especially on pressure it increased slowly in size reaching its maximum on the third day after which it slowly subsided. The whole process lasted 5 days during which the patient had some fever and headache. Examination of the finger blood on the eighth day revealed the presence of trypanosomes.

W Y

HANSCHALL (H. M.) NEWHAM (H. B.) The Initial Lesion of Sleeping Sickness. [Correspondence.]—*Lancet* 1929 June 1 p 1170

Both writers point out that, before 1910 MANSON taught that the indurated inflammatory lesion which developed at the exact site of and

surrounding, the tsetse bite, and sometimes persisted for many weeks, signified an *infective* bite. Newham observed two similar cases during the War in East Africa. Hanschell points out that notwithstanding Maxson's teaching, reference to his initial lesion is absent from the text books.*

W Y

RAMON GINER (D) Puede hacerse cronica la enfermedad del sueño?
Is there a Chronic Sleeping Sickness?—*Medicina Paises Cálidos*.
Madrid. 1929 Jan. Vol. 2. No. 1 pp 66-68.

The author gives brief details of three patients and states that he has histories of eleven, met with in Fernando Po, in whose blood trypanosomes had been present—" *T. gambiense* or one of its allies"—for 18 months or more, without producing any signs clinically. They show no glandular enlargements and appear to be in good health, physically and mentally.

H. Harold Scott.

NIÑO (Flavio L.) A propósito de un nuevo caso de enfermedad de Chagas en la República Argentina. (Consideraciones sobre su diagnóstico etiológico) [Another Case of Chagas's Disease in the Argentine and its Diagnosis].—*Revista Méd. Argentina*. 1928. Dec. 20. Vol. 13. No. 20. pp. 869-872. With 3 text figs. [4 refs.]

This is interesting as an example of "latent" Chagas's disease. The patient was a married woman of 33 years presenting the ovarian type of the affection—metrorrhagia, flushings of the face, nausea, insomnia, throbbing in the head, swelling of the thyroid, excess of hair on the face. Examination of the blood revealed no trypanosomes but quartan malarial parasites. Her blood was inoculated into laboratory animals, and though the blood of the latter was examined frequently during three and a half months no parasites were found in it. One was then killed and its tissues sectioned. Masses of the *Trypanosoma cruzi* were found in the kidneys and in the striated muscles there were signs of myocarditis, but no parasites in the heart-muscle. The chief point is that examination of the blood alone of the patient or of the inoculated animal, was insufficient to establish the diagnosis.

H. Harold Scott.

CRONBERG (A.) A propos d'un nouveau cas de trypanosomiase humaine américaine dans la ville de Catamarca. [Case of American Trypanosomiasis in the Town of Catamarca (Argentina)].—*C.R. Soc. Biol.* 1929 Jan. 18. Vol. 100 No. 2. p. 137

In October 1928, the author saw a Catamarcan child seven months old with very violent convulsions which terminated by paroxysms of spasmodic rigidity. Large numbers of *Trypanosoma cruzi* were found in the peripheral blood. The *Triatoma* captured in the house were heavily infected, about 80 per cent. harbouring metacyclic trypanosomes.

W Y

This statement as Dr. Maxson HARR points out (*Lancet*, 1929 June 8, p. 1223) is not strictly correct. A two-line reference to the local irritation following the bite of an infected glossina will be found on page 108 of "Maxson's Tropical Diseases" ninth edition.

MACROBERT (Russell G) *South American Trypanosomiasis of the Meningo-Encephalomyelitic Type in New York.*—*Jl Amer Med Assoc* 1929 Jan 19 Vol. 92. No 3 pp 230-231

Details of a case supposed to be one of South American trypanosomiasis contracted in Venezuela form the substance of this paper

A woman, aged 36 visited New York from her home in Venezuela in December 1927 because of failing vision and extreme nervousness. In the right eye there were dustlike and membranous opacities and four retinal exudates below the disk. The fundus was hazy. There were no haemorrhages. The left fundus was normal or slightly pale. In February 1928 the patient consulted the author with a view to obtaining neurologic examination. No definite signs of organic disease were found, except the following points which at the time seemed unimportant. There were indications denoting heightened irritability of the pyramidal motor system. The deep reflexes were exaggerated and a flexor defense reaction to a stroking of the sole of the foot was rapid and marked. The abdominal reflexes could not be elicited nor could the plantar reflexes. There was no limitation of the temporal fields of vision nor any pallor of the discs.

When next seen two months later the picture had completely changed. The patient was bedridden and exceedingly ill. She stated that in March a lumbar puncture had been performed and that the spinal fluid was apparently normal. A few days later she developed a temperature of 104 F with some catarrhal symptoms in the upper respiratory tract. The fever continued in a lesser degree for a couple of weeks and at the end of that time she became noisy unreasonable and unmanageable. When seen by the author in April, she lay stretched out stiff in bed and had frequent athetoid spasms of a rigid tonic character during which she would perspire profusely and moan loudly. She had lost her former ability to speak English and now spoke only Spanish, and this was often unintelligible. She had slight fever rapid respiration, and a rapid pulse. The palate was immobile. There was a definite Babinski reflex on each side. The pupils reacted to light and accommodation. There was unmistakable evidence of widespread brain involvement and the bulbar symptoms made the condition acutely grave. She continued to have an irregular fever with exacerbations and remissions. The blood count showed a relatively high percentage of lymphocytes the skin became bronzed, and the patient gave herself up to noisy meaningless howling. Gradually she became completely quadriplegic, aphasic and demented.

The author states that the points establishing diagnosis were the long and continuous malaise and remittent fever the increased percentage of lymphocytes the high pulse rate the continuously rapid respirations the bronzing of the skin, and the widespread brain involvement.

There was a history of a trip by the patient into the interior of Venezuela in September 1927 at which time it seems probable she was bitten by the germ-carrying fly.

[The case is an interesting one and it is unfortunate that no evidence is produced that it was one of South American trypanosomiasis.]

W Y

NIÑO (Flavio L.) [Jefe de la Sección de Seromicrobiología del Laboratorio Central del Hospital de Clínicas, etc.] *Contribución al Estudio de la Enfermedad de Chagas o Trypanosomiasis Americana en la República Argentina.* [Contribution to the Study of Chagas's Disease or American Trypanosomiasis in the Argentine.]—237 pp With 8 plates (7 coloured) 9 graphs 2 maps & 54 figs. 1929 Buenos Aires.

This volume conveys more information than the title would lead one to expect. It is true that it is a Contribution to the Study of Chagas's

Disease " but it is more than that from it may be learnt practically all that is known at present concerning the parasite, its vectors the clinical symptoms to which it may give rise the pathology of the disease produced, its epidemiology and so on. The information presented is based on eight years work. The experimental investigations were carried out, first at the laboratory of the Central Military Hospital under Dr. Salvador MAZZA and later at the laboratory of the National Hospital under Dr. MAZZA and Dr. Silvio PARODI.

The vectors exist over a very wide area and there are districts, particularly in the north, where a large percentage of them have in their digestive tract a flagellate which, morphologically and biologically presents the characters of *Trypanosoma cruzi* and behaves as such experimentally. In the same districts are patients presenting certain symptoms in common with the thyroid in particular which CHAGAS regards as indicative of chronic forms of the disease named after him such call for study in order that those definitely due to the parasite may be separated from cases of goitre or cretinism of the usual kind. A question naturally arises as to why human cases are comparatively rarely encountered when infected insects are so numerous. The author believes that cases are not after all very uncommon and that a more thorough examination of the people in these districts by house to house visits and the provision of mobile laboratories to facilitate search for the parasite in the blood of man (and animals) will discover a much higher percentage just as leishmaniasis as a cause of ulcers in America long escaped recognition because it was not specifically looked for.

The work is divided into six chapters. The first dealing with the history of the disease is very interesting. In 1907 when the Central Railway of Brazil was under construction, the workers found many blood-sucking insects locally known as "barbeiro" which attacked them at night. Some were caught and dissected and crithidial and leptomonad forms of a flagellate were found in the lower gut. Oswaldo Cruz inoculated them into guinea-pigs marmosets monkeys, dogs and rabbits, and showed that they were evolutionary forms of a trypanosome differing from those already known and described. Next, examination of the blood of local inhabitants revealed in several of the children a trypanosome which, subsequent experiments showed, behaved like those isolated from the *Triatoma*. This chapter gives an account of the symptoms in children which need not be recapitulated. Other arthropods were found to harbour the trypanosome, *Triatoma chagasi*, *Rhodnius prolixus*, *Cimex lectularius*, *Ornithodoros* and *Rhipicephalus sanguineus*. *Rhodnius* was the most diffused vector in Venezuela where *Triatoma* is absent. In 1915-16 KRAUS and others studied clinical forms of the disease and their relation to endemic goitre and cretinism. He found that in the mountainous zone of the Republic bugs were infected with *T. cruzi* and in parts of this zone were cases of goitre and cretinism but no acute cases of Chagas's disease were met with also that in the valley of Calcaqu  there were infected insects but no goitre and the same was noted in Buenos Aires and Cordoba. He decided that the chronic form of the disease was difficult to diagnose (parasites may not be found in the blood, but inoculation yields positive results) and was likely to be confused with goitre and cretinism and, finally that certain points called urgently for solution in particular (a) whether goitre and cretinism are found in the mountainous districts of Brazil (b) whether absence of Chagas's disease in the Argentine was due to attenuation of the virulence of the trypanosome.

The second chapter records the study of *T. cruzi* in the peripheral blood in infected animals the morphology in the digestive tract of the vectors and the stages of involution. This is illustrated by some excellent coloured plates. Next follows experimental work on the biology cultivation and evolution of the parasite and a study of the blood changes resulting from experimental inoculation of animals. Chapter III gives an account of various intermediate hosts. Several species of *Triatoma* may be infected,

notably *T. megistus* and *T. infestans* but in seven others the parasite may undergo its evolution. This, of course is not the same as saying that it does so in nature or that these others are true vectors. *Rhodnius prolixus* and *R. picipes* are the vectors in Venezuela. Other infectible insects are *C. lectularius*, *C. rotundatus*, *C. boueti*, *Ornithodoros moubata* and *Rhipicephalus sanguineus*. *T. infestans* is the principal host in the Argentine. CHAGAS and others have found small infecting trypanosomes in the salivary glands and he believes that infection is conveyed by the bite. TORRES has shown that adult insects infect more often than do larvae or nymphs. Experiments are described to demonstrate that infection is not transmitted by the *Triatoma* hereditarily.

As a general description of the disease Chapter IV is the most important. In it are described the clinical forms, the pathogeny and pathological anatomy, diagnosis, prognosis and treatment. The clinical forms are divided into three groups: acute, with trypanosomes in the peripheral blood; chronic, in which the parasite is not found; thirdly Metatrypanoidal phenomena—goitre, cretinism, infantilism. The chronic group is subdivided into pseudomyxoedematous, myxoedematous, cardiac and nervous forms, and the acute into those with and those without meningo-encephalitis. Yet further subdivisions are made particularly of the cardiac subgroup according to the character of arrhythmia present. The question of the goitrous form is the subject of a special chapter. The coincidence of the goitrous zone and that of American trypanosomiasis and the constancy of thyroid enlargement in the children attacked, and the histological findings lead to the conclusion that this is a form of Chagas's disease, says the writer though many dispute the causative relation.

The idea of attenuation of the virus in the Argentine is based on animal experiment. Guinea-pigs are very susceptible and rapidly succumb to the Brazilian virus, whereas in the Argentine they were very slightly susceptible. The slow and insidious evolution of the disease in children is adduced as another fact in favour of attenuation. The disease is latent in type going on for years the parasite not being found in the blood, although inoculation gives positive results.

This work summarises all that is known at present on the disease and until fresh evidence is produced will probably be regarded as the standard comprehensive work on a subject of much interest.

H. Harold Scott.

LAUTERBURG (Mark). Erfahrungen mit Tryparsamid bei Schlafkranken. [Experiences with Tryparsamide in Sleeping Sickness.]—*Arch f. Schiffs u. Trop. Hyg.* 1929 May Vol. 33. No 5 pp 251-257 [10 refs.] [Dr Albert Schweitzer's Hosp. Gabon, French Equatorial Africa.]

The conclusions are —

1 Tryparsamide proved of the greatest value in the treatment of 29 cases in the second and third stages of sleeping sickness. Even with the severest cases one can reckon on a cure in at least 60 per cent. of instances.

2. Since in about half the patients mild or severe disturbances of vision, even amaurosis may supervene the customary doses of 2-3 gm. should be greatly decreased especially in cachectic individuals.

3. Even a relatively small total quantity of tryparsamide (7 gm.) suffices in severe cases to produce a cure. The clinical cure proceeds parallel with the restoration to normal of the number of cells in the spinal fluid.

4. Human infections with *T. rhodesiense* and also animals infected with trypanosomes are resistant to tryparsamide.

5. In general paralysis tryparsamide causes improvement in about half the cases. [The two last conclusions are inferences from the published papers of others.]

W Y

BARLOVATZ (A.). L'arsénorésistance dans le traitement de la trypanose humaine par le trypanarsyl (tryparsamide belge) [Arsenic Resistance in the Treatment of Human Trypanosomiasis by Trypanarsyl].—*Bull. Soc. Path. Exot.* 1929 Mar 13 Vol. 22 No. 3. pp. 201-226.

Details are given of a series of observations on sleeping sickness cases treated by trypanarsyl or tryparsamide. The following are the conclusions —

1. A small number of cases of sleeping sickness are not benefited by either trypanarsyl or tryparsamide.

2. These patients may be either in the first stage of the disease or in a later stage.

3. When sterilization is not obtained with trypanarsyl or tryparsamide, atoxyl and novarsenobillon likewise fail frequently.

4. This state of arsenic resistance may exist at the time when the patient commences his first treatment. It can quickly develop in patients treated with temporary success by atoxyl or trypanarsyl.

5. Amongst the author's patients it was not possible to incriminate as the cause of the arsenic resistance a previous treatment of insufficient dosage.

6. It is recommended that cases in which arsenicals are not successful should be treated with moranyl or germanin in association with potassium emetic.

7. The last two trypanocidal substances have given good results even in patients with changed cerebro-spinal fluid.

W Y

SAUNDERS (G F T). Report on Cases of Trypanosomiasis treated with Bayer 205.—*Gold Coast Rep on Med. & San Dept for Year Apr., 1927 to Mar 1928* Appendix B. pp. 91-104 [3 refs.]

In a previous report dated February 1928, three cases were classified as apparently cured—two of these have since died of sleeping sickness, and the third has relapsed. All the six cases previously reported as improved have died, as also has the case recorded as not improved. The result up to date therefore of the treatment of the 18 cases referred to in the previous report is as follows—13 are dead, one is better but not cured, and two have disappeared. The author remarks that all these cases exhibited at the time of treatment symptoms indicating involvement of the central nervous system, that the majority of cases improved markedly after treatment, and that permanent sterilization of the peripheral blood was produced in all cases but one.

Details are given of 24 further cases all presenting symptoms suggesting involvement of the nervous system and all treated with intravenous injections of Bayer 205. The results to date are as follows —

Apparently cured	..	6
Improved	.. ..	7
Not improved	.. ..	2
Dead	.. ..	9

Five similar cases were treated with small doses of very dilute solutions of Bayer 205 intrathecally—details are given. The author states that alarming symptoms may follow even these small doses, and that advanced cases are not benefited. One acute case with definite cerebral symptoms, but with only 4 cells per cmm. of cerebro-spinal fluid, was apparently cured. An inconclusive attempt was

made to treat a case with trypanosomes suspended in Bayer 205. The immediate result was good but the patient gradually relapsed and the condition is now as bad as previously.

W Y,

MACLEAN (G) A Dermatitis associated with "Bayer 205" Treatment of Rhodesian Trypanosomiasis.—*Ann Trop Med. & Parasit* 1928. Dec. 28. Vol. 22. No 4 p 531

Cases of Rhodesian trypanosomiasis whilst under treatment with Bayer 205 sometimes develop a well-defined form of dermatitis. The author has seen two such cases, and has heard of two others. In one case the condition developed two days after the third injection of Bayer 205. It commenced as a papular rash the papules tended to coalesce. Later the epidermis darkened and large blisters formed these became excoriated. After about a week, the lesions began to heal and became dry and scaly. Coincidentally with these skin lesions there developed conjunctivitis which became purulent and stomatitis.

W Y

DE ALMEIDA (Enrico) Valor comparativo dos tripanocidas empregados pela zona sanitária do Cuanza. [Comparative Value of Trypanocides employed in the Cuanza Sanitary Zone.]—*Bol da Assisi. Méd. aos Indígenas* Loanda. 1928. Oct. Vol. 2. No 10 pp 183-188 French summary p 189

The following summary is given —

1 The prophylactic method adopted viz. 10 injections of 5 gm. of atoxyl given at fifteen-day intervals, and followed by four months rest, gave a negligible number of relapses amongst trypanosomiasis cases in the first period.

2 The attempts at treatment of these in the second, third and last stages of the disease gave only aleatory results their only chance lay in their segregation into appropriate camps constructed on the Hut Infirmary plan.

3 It was necessary to try without interfering with the prophylactic measures, the effect of Bayer 205 in those places where the percentage of infection is greatest viz. Zenza, Luinha and Canhoca.

4 A species of trypanosome differing from *T. gambiense* was met with fairly frequently in human blood its identification should be undertaken without delay.

5 The large industrial concerns which manufacture anti trypanocidal remedies should send to Angola samples of their new products in order that the author and his colleagues might be permitted to collaborate in the great work against sleeping sickness.

W Y

PFRANZENSTIEL (W) & SCHARLAU (B) Heilversuche an trypanosomeninfizierten Tieren auf unspezifischem Wege. Zugleich eine Möglichkeit zur Verbesserung der Germaninwirkung. [Curative Experiments in Trypanosome Infected Animals with Non-Specific Means. Possibility of improving the Action of Germanin.]—*Cent f Bak I Abt. Orig* 1929 Vol. 110 Beiheft. No 6-8. pp 84*-86*

The majority of investigators who have interested themselves in the question of the curative effect of human serum on infected mice and

rats have limited their enquiries to a study of the trypanocidal phenomena and have neither concerned themselves with an attempt to analyse the mode of action or to isolate the active substance, nor with the question whether it has any practical value. The work of many authorities suggest that the trypanocidal active substance in human blood is allied to chemotherapeutic drugs and that these bodies do not act directly on the parasites, but only after incorporation into the animal organism.

The injection of human serum rarely sterilizes infected mice, but after 8 to 14 days a relapse usually occurs, which rapidly leads to death. Repeated injections have progressively less and less effect, and previous treatment of an animal with human serum prevents its therapeutic action when the animal is subsequently infected. These observations indicate that human serum is of little practical therapeutic value and in any case that it would only become so if it were possible to isolate the active substance in pure form.

A series of experiments showed that from the formed elements of the blood no active substance could be prepared, and that this is to be found only in the fluid portion of the blood. The authors' efforts to isolate the active principle are not yet completed, but they seem to indicate the direction which investigations might take, viz., by concentration of the serum to increase its activity. Normal human serum was dried in a Faust Helms apparatus, pulverized in an agate mortar and taken up in a quantity of physiological saline. By this means a fluid was obtained through which—provided it had above a certain serum powder concentration—it was found possible by a single subcutaneous injection of 0.3 cc. definitely to cure a heavily infected dourine mouse.

These experiments showed that by this technique smaller amounts of serum powder sufficed than did a corresponding amount in the serum itself. An injection of 0.3 cc. serum (containing about 25 mgn. of dry substance) was always followed by a relapse in 8 to 14 days, whereas an injection of the serum powder solution prepared from the same amount of serum resulted in permanent cure.

This led the authors to enquire whether the action of germanin might not be strengthened if it were combined with dry serum. This proved to be the case as by simultaneous intraperitoneal injections of inactive doses of germanin and dry serum, infected mice were permanently cured. Similarly the action of neosalvarsan was increased, but to a less extent than that of germanin.

The authors are at present engaged in an attempt to obtain the trypanocidal active substance of human serum in such a degree of purity that it may be possible to cure larger animals with it. Preliminary experiments on macaques appear to be hopeful.

W Y

ZAVAGLI (Vittorio) Note di bacterioterapia e di chemioterapia nella infezione sperimentale da *Trypanosoma brucei* [Bacteriotherapy and Chemotherapy in Experimental Infection with *Trypanosoma brucei*].—Arch. Ital. Sci. Med. Colon. 1929 Jan. 1 Vol. 10. No. 1 pp 14-29. English summary p. 30 [Pasteur Inst., Paris]

This article is of interest in adducing further evidence of the antagonism of two infections, one protozoal, the other bacterial.

White mice were inoculated with known numbers of *Trypanosoma brucei* and with various bacterial vaccines—staphylococci, streptococci, pneumococci, meningococci, *B. pyocyaneus* and Pasteur's anthrax vaccine 1 and 2. The five first named had no effect on the evolution of the trypanosomes in the mouse but with the Pasteur Premier vaccin the trypanosomes were late in appearing and the animals survived whereas with either separately death occurred from the infection.

The action of injected chemical substances on the development of trypanosomes was not great in non-toxic doses. The double thio-sulphate of Au and Na in a dose of 3.5 mgm subcutaneously was toxic without destroying the trypanosomes but 0.1 to 0.3 mgm delayed their appearance. colloidal magnesium hydrate had a similar if anything a rather more definite effect. A large number of chemical substances was tested but these were the only ones to give any definite result.

H. Harold Scott.

KRITSCHIEWSKI (I. L.) & KAGANOVA (S. S.) Zur Frage der antimutativen Wirkung des Germanins [The Question of the Antimutative Action of Germanin].—*Ztschr f Immunitätsf u Experim Therap* 1929 Vol 61 No 5/6 pp 478-485 [2 refs] [Microb Research Inst Education Commissariat R S F S R. Moscow.]

Shortly before his death MORGENTHAU published the important observation that germanin possessed the power of suppressing the relapse strain formation of trypanosome races (*T. brucei* strain Prowazek). This was called the antimutative capacity of the drug. [See this *Bulletin* Vol 21 p 757.]

One of the authors working with another strain of *T. brucei* (Berlin) failed to confirm MORGENTHAU'S observation and with a view to clearing up the discrepancy and to ascertaining whether it was due to the particular parasite with which he was working, the authors repeated the experiments with 8 different strains and species of trypanosomes.

The conclusions are as follows—

1 The antimutative action of germanin on trypanosomes is not unconditional; it exerts itself only in higher or less degree according to the species and strains of the trypanosomes.

2 The antimutative action of germanin is strongest with *T. brucei* strain Prowazek, less with *T. equiperdum* and quite slight with *T. pecaudi* and *T. evansi*.

3 With *T. brucei* Berlin, *T. brucei* Paris, *T. salm* and *T. rhodesiense* germanin exhibits no antimutative power.

W. Y.

HORNBY (H. E.) The Detection, by Means of the van den Bergh Reaction, of Incipient Liver Necrosis due to Antimony Therapy.—*Vet Rec* 1928, Aug 11 Vol 8 No 32, pp 648-653 [4 refs] [Dept Pharmacol Univ College London.]

The author states that up to the present nothing has superseded tartar emetic in the treatment of the common forms of African bovine trypanosomiasis. The great drawback to its use is the danger of acute liver necrosis. In order that antimony therapy might be rendered

safe, it appeared necessary to find a simple liver function test which would reveal the effect on that organ of previous injections and divulge with what safety the next could be given. With this object in view the author performed the van den Bergh test on rabbits dosed experimentally with tartar emetic. The following summary of the work is given —

"The chief drawback to the use of tartar emetic as a trypanocide is that it may cause acute liver necrosis.

"Ordinarily liver necrosis is the result of a series of doses and the research had as its objective the finding of a simple liver function test which would reveal the effect on that organ of previous injections, and divulge with what safety the next could be given.

It was thought that the van den Bergh test of bile-pigments in serum or plasma might fulfil these conditions. A description of the test is given.

"Using initially healthy rabbits it was possible to produce various degrees of liver injury by means of intravenous injections of tartar emetic, and to correlate the lesions with plasma reactions to the van den Bergh test.

When a series of medicinal doses of tartar emetic are given, the injection which causes fatal necrosis is generally preceded by one which occasions only slight necrosis and it is for the detection of this early injury that the van den Bergh test is particularly valuable.

"Damage to liver cells amounting to acute fatty degeneration, but short of actual necrosis, may not provoke a van den Bergh reaction. Nevertheless, the rule is that if an injection is not followed by a van den Bergh reaction, it is safe to repeat the dose.

"Reverse: if an injection sets up a reaction then it is unsafe to repeat the dose until the reaction has subsided completely.

It is recommended that in tartar emetic therapy one should start with the small dose that experience has taught is safe and use the van den Bergh test while raising the dose to the desired medicinal one and to the end of treatment.

Fouchet's test is described. It is a good and delicate confirmatory test of the presence of bile pigment in serum or plasma."

W J

PHILIPTSCHENKO (A) Zur Frage über den Entwicklungszyklus von Trypanosomen im Säugetierorganismus. Vorläufige Mitteilung. The Developmental Cycle of Trypanosomes in the Mammalian Host. — *Cent f Bakt I Abt Orig* 1929 Feb 16 Vol III No 1/3 pp 125-138. With 6 text figs. [Pasteur Bact. Inst. Leningrad.]

The author emphasizes the fact that the mechanism of the production of relapses which are so common in some protozoal and spirochaetal infections is not thoroughly understood. Most workers have confined their attention to the part played by the host and have ignored to a great extent the parasitic factor. It is known that certain protozoa renew from time to time their organism by a reconstruction of their nuclear apparatus (endomitosis).

Certain strains of malaria parasites and of pathogenic trypanosomes have been preserved for many years in vertebrate hosts without having been able to pass through their sexual cycle. This fact could be explained either by the immortality of the protozoa (WIESSMANN) or by the hypothesis that under certain circumstances complicated biological renewal processes of their organism take place. The latter possibility appears to the author as the most likely and it is with this question that the present paper is concerned.

The experiments were performed with guineapigs rabbits and mice and the laboratory strain of nagana (Yakimoff). The inoculations were so arranged that approximately the same number of parasites was injected subcutaneously on each occasion. The number of parasites in the peripheral blood of the inoculated animals was determined as far as possible every day at the same hour. At first they were counted against the red cells in a Thoma Zeiss apparatus but later the simple course was followed of counting the parasites in a number of microscope fields (Oil immersion and Oc. 4) and then calculating the number present in 100 fields. In addition, in the case of some of the guineapigs daily observations were made on the temperature weight and blood picture (erythrocyte and leucocyte number haemoglobin value and differential leucocyte count). Some of the animals died a natural death and others were killed by chloroform at various periods during the infection. In both cases smears were made from most of the organs and the organs themselves were examined histologically.

The experimental infection in the guineapig assumed one of two forms—the acute form or the subacute-relapse form. In the former the disease lasted 8–15 days and in the latter 18–35 days. The incubation period varied from 2 to 12 days and appeared to be somewhat greater in the subacute cases than in the acute. No definite differences were made out in regard to the temperature and weight curves or the red cell count. Both types of infection were characterized by a constant decrease in the number of erythrocytes and in the haemoglobin value. This, however, did not hold true for the leucocytes. In the first stages of the disease there was almost always a moderate leucocytosis which was followed by a fall in number. In the acute cases this fall was continuous and in direct relationship to the increasing number of trypanosomes. In the subacute cases the period of disappearance or decrease in the number of trypanosomes was marked by an increase in the number of leucocytes and, conversely when the trypanosomes again increased in number the leucocytes decreased.

The two types of infection are most clearly distinguished by the behaviour of the trypanosomes in the peripheral blood. In the acute form the number of parasites increases incessantly day by day. In the subacute forms the trypanosome curve shows two peaks clearly separated by a marked depression which may even amount to a total disappearance of parasites from the blood. In both forms death occurs under similar conditions, and post mortem examination shows no definite differences. If however the animal is killed at the time of disappearance of the parasites a number of appearances are observed which deviate from those discovered in animals in which the disease has run its course. Above all, in such cases the customary changes were much less pronounced. The lymph glands were but slightly enlarged and hyperaemic, and hyperaemia and haemorrhages from the intestine and diaphragm were absent. In these cases however there were almost invariably small fresh haemorrhages into the lung tissue—an appearance which was never seen in other cases.

In the author's series of experimentally infected guineapigs acute and subacute infections appeared quite irregularly and acute infection might be followed by two or three subacute infections or *vice versa*. Careful study of the protocols however suggested that possibly the stage of the infection at which blood was withdrawn for inoculating the next animal might determine the matter. It was eventually found that if the subinoculation was made from blood withdrawn early in the infection a subacute infection might be expected whereas if it were made from blood taken at a late stage an acute infection

would result. If in a series of animals inoculations were made always with trypanosomes withdrawn at the end of the infection, it was found that one relapse type of infection always followed two or at the most three acute infections under these conditions of experiments two or more subacute infections never followed one after the other. This alternation of both types of infection the author calls the normal progress type of the artificial trypanosome disease in guinea-pigs. Each repetition of two or more relapse forms one after the other is a departure from the normal type and is dependent entirely on the time at which the blood was taken for inoculation. In the normal progress type of the artificial trypanosome disease the whole series of generations from one relapse to another must be regarded as a single developmental cycle of the parasites within the guinea-pig.

The author next passes to a consideration of the morphology of the trypanosomes in the acute and subacute types of infection. In the majority of cases nothing of special significance was found, but in isolated cases of the relapse type just at the beginning of the increase in parasites a few examples of the so-called "chromidial forms" were discovered. These are distinguished from the normal forms by their feebly staining cytoplasm and especially by the absence of a nucleus which is distributed as a chain of chromatin granules. Such forms are exceedingly rare and found only in the first stage of the relapse period. In some cases striking differences in the number of divisional forms and in the type of division were observed before the disappearance of the trypanosomes and after their reappearance during the relapse. In the former case practically only binary division is seen, whilst in the relapse forms undergoing multiple division are encountered.

In examining smears and sections of the organs nothing of special interest was discovered, except in those of the lungs of animals killed at the time of disappearance of trypanosomes from the blood. In the regions showing the small haemorrhages an occasional small round sharply-defined mass 12 to 20 μ in diameter was seen in the alveolar wall. On suitable staining this was found to consist of a thin capsule containing a great number of bodies, 2 to 3 μ in diameter which resembled merozoites and consisted of a nucleus and cytoplasm. In some preparations a darkly stained rod was seen close to the nucleus, reminding one of *Leishmania*.

As a result of his observations, the author believes that relapses are due primarily to a biological property of the parasites and not to immune processes of the organism of the host, and that the bodies he has discovered in the lungs represent a reconstruction process of the nuclear apparatus of the parasite.

W 1

SOLLAZZO (Germano) Der Einfluss des Hungers und der Avitaminosen auf die Resistenz gegen Trypanosomen-Infektionen. [The Influence of Starvation and Lack of Vitamins on the Resistance against Trypanosome Infections.]—*Ztschr f Immunittät u Experim. Therap* 1929. Vol. 60. No. 3/4 pp. 239-246. [17 refs.] [Robert Koch Inst. for Infectious Diseases, Berlin.]

Reference is made to previous work showing that starvation and vitamin deficiency reduced the body's resistance to bacterial infections, hitherto however no observations have been made on the influence of these factors on protozoal infections.

In this work, the author has examined the effect of starvation and lack of vitamins in pigeons inoculated with *T. brucei*. He first showed that pigeons normally are completely refractory to *T. brucei* and that when large amounts of a highly virulent strain are injected, the parasites quickly disappear from the circulatory blood and internal organs. Pigeon serum mixed with *T. brucei* and then injected into mice does not prevent infection. Pigeons were subjected to complete starvation and given only water. Others were fed exclusively on white corn from which the antineuritic vitamin had been removed. These animals began to develop symptoms after 16 to 32 days; polyneuritis reached its height after 20 to 35 days, and death occurred in 28 to 70 days.

The experiments performed with the normal animals, with those in a state of starvation and with those deprived of antineuritic vitamin are described in detail. The conclusions reached are as follows —

Experiments to infect normal pigeons with nagana trypanosomes have shown that the birds are insusceptible and that the parasites are unable to multiply in the body of the bird. Of 10 pigeons only two showed a blood infection during the first 24 hours and this had disappeared within 48 hours.

In normal pigeons there is no focus or development of the parasites in the internal organs.

In the starving animals 5 out of 6 exhibited a decrease of resistance to the trypanosomes. In two animals there was an obvious multiplication of the parasites in the peripheral blood and in 5 of the 6 the inoculation was positive. In one case parasites were proved by inoculation to be present in the blood up to the fifth day.

Deficiency of vitamin B rendered possible the multiplication of the trypanosomes in the body of the pigeon, so that in one case they were demonstrated up to the eleventh day by subinoculation. It is possible that the trypanosomes had a feeble pathogenic action which expressed itself in an acceleration of death due to lack of vitamin B.

W. Y.

BLIGLER (L. J.) & COMAROFF (R.) Susceptibility and Resistance to Trypanosome Infections. V. The Resistance of Rats to Infection. — *Ann Trop Med & Parasit* 1929 Apr 26 Vol. 23 No 1 pp 103-120 With 2 figs. [11 refs.] [Dept of Hyg. Hebrew Univ. Jerusalem.]

The following summary is given —

A study was made of the course of a trypanosome infection in rats and of the character of their resistance to such infections. The investigation was carried out by following the course of infection in rats by repeated counts of the number of trypanosomes in the circulation. An analysis of the data indicates that —

1. The infection in the rat is of an order intermediate between that in the mouse and guinea-pig. The rat possesses a resistance which is probably the same in kind as but different in degree from, that of the guinea-pig.

2. Although the infection is a progressive one there is a constant destruction of trypanosomes throughout the course of infection.

3. Depression of the resistance may result in an infection which approximates more closely that of the mouse. This phase of the question is now under investigation.

4. At time of death the concentration of trypanosomes in the circulation is constant. For the species studied, the average numbers were 1440 000 for *T. conaxi* and 1420 000 for *T. gambiense*. The red cell count is also greatly reduced but varies a great deal more than the trypanosome count.

The direct causal relation of these factors to death of the animals is not certain. It appears, however that death is due to injury produced by the metabolic products of the trypanosomes (lactic acid) and that the organisms must reach a certain concentration, which differs with different species, before they can affect the changes or intoxication which lead to death. Disturbance in the oxidation mechanism is probably a critical element in the process."

W 1

ADAMS (Paul) Ueber das Wesen der trypanoziden Wirkung menschlichen Normalserums [The Trypanocidal Action of Normal Human Serum].—*Zucker f. Immunbiol. u. Experim. Therap.* 1928. Vol. 58. No. 5/6. pp 459-482. [41 refs.] [Hyg. Inst. Westphalian Wilhelms Univ. Münster]

After summarizing the observations of previous workers, the author points out that the mechanism of the trypanocidal action of normal human serum is still by no means clear. The questions which the author has attempted to answer in this paper are first, whether other substances, which can be regarded as irritant bodies, can develop in infected mice a trypanocidal action similar to that of human serum and second, what properties render the human serum trypanocidal.

White mice infected with nagana (strain 30 Telchmann-Braun) or dourine were used exclusively in these experiments. About 0.2 cc. of blood from heavily infected mice, diluted in saline and injected subcutaneously produced in the experimental animals a very acute infection. In the case of the nagana strain the parasites were numerous in the blood in 50-60 hours and death occurred in the majority of instances in 3 days. With the dourine strain the trypanosomes appeared in the blood on the third day and death as a rule took place on the fourth and fifth day. The injection of the sera or other substance was generally made subcutaneously but sometimes intravenously or intracutaneously.

The following summary of the experiments and conclusions is given —

1. The trypanocidal effect of the injection of normal human serum in trypanosome infected mice is not due to a purely "irritant body" action. In comparable experiments it was found that injections of such substances as Aolan, casein and Yaten-casein, were without any effect on the trypanosome infections in mice. Similarly the injection of other substances such as bile, urea, emetine, iodine weak acids etc., which on injection into rabbits cause an increase in the anti-typhoid action of the serum, failed to cause the disappearance of trypanosomes from the blood of mice.

2. The sera of rabbits, guinea-pigs, sheep, cattle, horses, pigs, and the lower monkeys (macaques) were likewise without action, as was also the serum of horses which had been immunized against diphtheria.

3. Macaques could be fatally infected with the nagana strain.

4. In contrast to the action of germann that of normal serum did not in the author's experiments result in complete sterilization of the infection. About 7 days after the injection of the serum a relapse occurred. Further injections caused the parasites to disappear again for some days, but the effect of repeated injections gradually became weaker.

5. The trypanocidal power of human serum is definitely diminished by heating to 56° C. Serum inactivated at 56° C.-60° C. has a very poor trypanocidal action as compared with that of active serum. Heating for half an hour at 62° C. completely destroys the trypanocidal power of normal human serum.

6 The trypanocidal power is also lessened by keeping the serum for from 2-4 weeks at room temperature

7 Serum inactivated by heat cannot be re-activated by the addition of fresh guinea pig complement. A certain reactivation of old serum through the addition of fresh guinea pig serum was observed in one case but the observation could not be repeated

8. Human blood which had clotted slowly at 0 C. furnished a weaker trypanocidal serum than that which had clotted quickly at 37° C. The different degree of the destruction of blood platelets consequently appears to be not without significance

9 Syphilitic sera, giving a positive Wassermann reaction, is in general, more strongly trypanocidal than Wassermann-negative sera. In one case a mouse was completely cured of a nagana infection by a single injection of a Wassermann positive serum. The stronger action of the Wassermann positive serum is also seen after inactivation at 56 C for half an hour

10 The trypanocidal action of human serum is of a specific nature and can apparently be increased through syphilitic infection.

W Y

HELM (R.) Zur Aetiologie des Oedems bei der Trypanosomiasis der Tiere. [On the Etiology of the Oedemas in the Trypanosomiasis of Animals.]-*Cent f Bakt. I Abt. Orig* 1929 Vol. 110 Beiheft. No. 6/8. pp 87*-89*

Reference is made to the work of BATTAGLIA who states that the oedema in trypanosomiasis is in large part due to marked degenerate and atrophic lesions in the thyroid and parathyroid glands [this *Bulletin* Vol. 24 p. 972] The author then records observations made by him before the war which he considers throw further light on the mechanism of this symptom. Oedema may manifest itself at any time in the disease—sometimes it is seen after a few days but more often shortly before the death of the animal. He recalls the case of a horse which had extensive oedema all over the under part of its belly the owner stated that it had been in a tsetse region for weeks previously Blood examination was negative and remained so for four days. After the lapse of these four days there set in a thrombosis of the left femoral artery and a complete palsy of the hind limb Fibrolysin 115 cc. was injected into the jugular vein After an hour the swelling had definitely decreased and numerous trypanosomes appeared in the blood. The following day the swelling had completely disappeared and the palsy likewise.

This observation induced the author to institute an enquiry whether the administration of fibrolysin in a trypanosome-free period caused the re-appearance of parasites in the peripheral blood. He conducted experiments with one horse, one dog ten rabbits and ten guinea pigs injected with nagana or dourine. Unfortunately both the horse and the dog were failures as neither showed oedema or trypanosome-free intervals. Very satisfactory observations were, however made with seven of the rabbits. In every case with a single exception an injection of 115 cc. of fibrolysin in a trypanosome free period sufficed to cause the appearance of parasites in the peripheral blood, as a rule within 15 minutes.

The author now explains the origin of the oedema in the case of the horse above described on the hypothesis that probably an agglomeration of trypanosomes with other blood elements had taken place. The thrombus and its constituent parts were set free by the thrombolysin and thus trypanosomes reappeared in the peripheral blood.

W Y

KLIGLER (L. J.) & GEIGER (A.) Lactic Acid Content of Blood of Trypanosome Infected Rats.—*Proc. Soc. Experim. Biol. & Med.* 1928 Dec. Vol. 28, No. 3, pp. 229-230 [2 refs.] [Dept. of Hyg. Hebrew Univ. Jerusalem.]

The authors point out that experimental trypanosome infection in rats presents one of the simplest pictures of protozoal blood infection. The significant features of the infection are (1) An increase of the trypanosomes to a constant number which seems to be characteristic of the species (2) Anaemia, which is variable, ranging between 30 per cent. and 50 per cent. of the original cell count (3) Sudden death with symptoms of dyspnoea within 10 to 36 hours after the trypanosomes have reached the maximum concentration. There are no toxic symptoms and the injection of large numbers of trypanosomes or of a large amount of serum taken from an animal shortly before death does not produce any symptoms of intoxication.

These facts give rise to two questions firstly the reason for the cessation of multiplication of the trypanosomes and secondly the actual cause of death.

With a view to answering these questions, the authors decided to study the changes in the blood chemistry during the course of the infection. SCHERN (1926) has shown that there is a reduction in the fermentable substances in the liver of trypanosome infected animals, and consequently it seemed likely that during the infection the available glycogen and glucose reserve was used up by the trypanosomes to the point of exhaustion, and that at the same time lactic acid was produced which caused progressive exhaustion of the alkali reserve, this depletion ultimately resulting in the death of the animal. In a table the concentration of lactic acid in trypanosome infected rats at different stages of the infection is shown. From this table it appears that there is a progressive rise of the lactic acid concentration in the blood, which runs parallel with the increase in the number of trypanosomes in the blood stream.

W. V.

MORISHITA (KAOBO) Flagellate Parasite of *Triatoma rubrofasciata* (Hemiptera Heteroptera) and the Trypanosome developing from it in Laboratory Animals. (Preliminary Note.)—*Taiwan Igakku Zasshi* (Jl Med Assoc Formosa) 1928, Dec. No. 285. [In Japanese English summary pp 77-79] [Govt. Research Inst., Formosa, Japan.]

It is well known in Formosa that the reduviid bug *Triatoma rubrofasciata* is prone to attack man and cause more or less severe symptoms. The bugs captured in houses harbour flagellates in their intestines. 100 per cent. of the females and 78.5 per cent. of the males are infected. The flagellates were never found in the body cavity nor in the salivary glands or malpighian tubes. In the intestines various stages were found, viz. long and short crithidia leishmania forms metacyclic trypanosomes and various transitional forms.

The presence of metacyclic trypanosomes suggested that the parasite was a trypanosome of a vertebrate host. Intraperitoneal inoculation of the intestinal contents of the bugs into mice produced infection in 5 of 8 cases subcutaneous inoculation failed. The incubation period varied from one to eight days the parasites in the peripheral blood were always scanty and were to be seen for only 7 to 37 days.

Dividing forms were occasionally encountered. In a splenectomized mouse the trypanosomes were found in the blood for as long as 63 days. The passage through mice succeeded for only two generations. The infection in mice was apparently not pathogenic.

In the blood of the mouse the parasite is very long and slender measuring on an average 56.9μ in length and 3.1μ in breadth. The ratio of the distance between the blepharoplast and the posterior end of the body to the total length of the body is 1 to 2.7. The parasite was never found in the tissues or organs of the mouse. It develops in the condensation fluid of blood agar.

W Y

JOHNSON (Thurston L.) *In Vivo Trypanolysis with Especial Reference to Zones of Inhibition, Relapse Phenomena and Immunological Specificity*—*Amer J Hyg* 1929 Mar Vol 9 No 2 pp 260-282. [39 refs.] [Dept of Hyg & Bact Univ Chicago]

The following are the conclusions —

(1) If mice are infected with *T. equinum*, *T. brucei* or *T. equiperdum* and treated with the proper doses of trypanolytic serum, they show a sharp trypanolytic crisis and a prolongation of life as compared with untreated controls.

(2) When a series of mice infected with *T. equinum* or *T. brucei* are given graded doses of immune serum doses greater than the minimal effective dose are not necessarily effective but zones of effectiveness may alternate with zones of non-effectiveness (zonal phenomenon).

(3) The occurrence of the zonal phenomenon is dependent upon the number of trypanosomes present in the blood at the time of the administration of immune serum. Thus the following relationship is found in strain J4 of *T. equinum*.

Number of trypanosomes per
standard microscopic field at
time of treatment with immune
serum.

1 to 5

9 to 33

45 to 50

Occurrence of the
zone phenomenon.

No zone phenomenon. All
doses greater than the minimal
effective dose are effective.

Zone phenomenon. Doses
greater than minimal effective
dose show alternate zones of
effectiveness and non-effec-
tiveness.

No lysis in any dose

Similar results have been obtained with a strain of *T. brucei*.

(4) A study of relapsing strains arising after serum treatment in mice has yielded the following results.

(a) There is a great variability in the resistance acquired by the trypanosomes after *in vivo* contact with immune serum. Thus if a series of infected mice is treated with immune serum and lysis occurs, and again treated with the same serum when the relapse strain has reached the same blood population as before a second lytic action occurs in a small number of cases contrary to the general preconceived ideas.

(b) In those relapse strains which did not become resistant, there is a change in the relationship of the number of organisms per cmm and the occurrence of zones of inhibition. Thus J4 which originally gave the zone phenomenon when there were from 10 to 30 trypanosomes per standard field after relapse gave zones of inhibition when there were only 1 to 3 parasites per field.

"(5) The action of the lytic antibody is as definite on heterologous strains as on the homologous strain. This is not in agreement with previous reports of the extreme sensitivity of cross-immunity tests.

"(6) Some permanent cures have been obtained. It is of interest to note that of six obtained, five resulted from the action of heterologous serum in one experiment."

W Y

JOHNCOX (Thurston L.) The Non-Occurrence of the Zone Phenomenon in the Curative Action of Drugs and Normal Human Serum in *Trypanosoma quinque* Infection.—*Amer J Hyg* 1929, Mar Vol 9 No 2 pp 283-291 3 refs. [Med. Dept. Univ. of Arkansas Fayetteville]

The following are the conclusions —

Zones of effectiveness and non-effectiveness of immune serum *in vivo* analogous to the Neisser Wechsberg phenomenon *in vitro* have been previously described in mice infected with *T. equinum*. The present work involving 16 series containing a total of 280 mice would seem to indicate that a similar phenomenon does not occur when a series of infected mice are treated with graded doses of several of the trypanolytic drugs, but that all doses above the minimal effective dose destroy the trypanosomes. Likewise from a study of 5 series involving a total of 75 mice all doses of normal human serum above the minimal trypanocidal dose destroy the trypanosomes.

W Y

SCHILLING (Claus) & SOLLARZO (Germano). Wirken Trypanosomen mit Immunsérum behandelt, als Antigen? [Do Trypanosomes treated with Immune Serum act as Antigen?]
—*Ztschr f Immunol u Experim Therap* 1929 Vol 59 No 3/4 pp 219-221 3 refs.

The authors point out that as yet little is known regarding the mode of action of immune sera against trypanosomes. They observed that a mouse which had been injected with a mixture of guinea pig immune serum + *T. brucei* (strain Prowasek) remained trypanosome free for 20 days and even after a second large injection of trypanosomes remained free from parasites for several days and did not die until the seventh day although the control animals certainly die in 3 to 4 days. The author next inquired whether this increased resistance was a constant phenomenon. They employed a dried immune rabbit serum the activity of which kept well it was not parasiticidal *in vitro* as even after 24 hours the parasites were still motile. Trypanosomes kept in fresh immune serum are certainly killed. Experiments showed that the protective action was always marked when the serum-trypanosome mixture was injected into rats or mice but that an immunity against a large injection of trypanosomes, even after several repeated treatments, was only to be seen in quite small degree. Similarly the serum of a rat, which had received three trypanosome + immune serum injections and had remained free from infection, when mixed with trypanosomes and injected into three mice, only prolonged life for 2 to 4 days.

In further experiments trypanosome blood was mixed with immune serum and fresh guinea pig serum (complement) and allowed to stand at 37° C for 1 hour the mixture was then centrifuged and the deposit

injected into mice. In controls the whole mixture was injected. In both cases infection although delayed, occurred, from which it is concluded that the addition of complement is without significance.

The conclusions are —

1 Immune serum exerts at times a parasiticidal action against trypanosomes *in vitro* from which a direct action in the animal body can be inferred. Sometimes however it does not kill the parasites *in vitro* but when injected with the trypanosomes into an animal prevents infection.

2 The latter action is not dependent on the complement content of the animal body.

3 The combination between immune-body complement and trypanosomes could not be demonstrated with the nagana strain used.

4 An immuno-antigen action of the trypanosome suspension in immune serum did not emerge or only in an indefinite manner in these experiments.

W Y

SCHILLING (Claus) Ueber Immunität bei Trypanosomeninfektionen [On Immunity in Trypanosome Infections.]—*Ztschr f Immunitätsf u Experim. Therap* 1929 Vol. 61 No 5/6. pp 381-383 [Robert Koch Inst. Berlin]

A parafuchsin resistant strain was produced by treatment of animals infected with a strain of nagana (Prowazek) this strain was blepharoplastless. With this strain 8 rats were infected and two days later treated with 0.5 cc. of a 1 in 1000 solution of tartar emetic. Five days later 4 were injected with the original Prowazek strain and 4 with a strain of nagana which had been maintained for years in Hamburg.

The following conclusions are reached from these experiments —

1 If an infection due to a chemically changed strain is completely cured or reduced to a labile infection and if later the original strain is superinfected, infection does not result. The specific antigen property of the strain is not influenced by chemical action (drug resistance loss of blepharoplast).

2 The labile infection with a (chemically changed) laboratory nagana strain confers no immunity against a laboratory nagana strain of different origin.

3 Infections with two different strains can run concurrently without influencing or adding to each other's action.

W Y

REGENDANZ (P) Der Blutzucker bei Trypanosomeninfektionen. [The Blood Sugar in Trypanosomal Infections.]—*Arch f Schiff's Trop Hyg* 1929 May Vol 33 No 5 pp 242-251 [10 refs.] [Inst. for Ship & Trop. Diseases Hamburg]

The behaviour of the blood sugar in trypanosomal infections of animals has attracted a good deal of attention during recent years but the results obtained by various workers have been by no means uniform. The author has accordingly conducted further experiments on the subject and has reached the following conclusions —

1 The blood sugar value in the case of rats infected with pathogenic trypanosomes is depressed only at the end of the disease.

2. Infections of monkeys with *T. rhodesiensis* are accompanied by a decrease of blood sugar but this is independent of the number of trypanosomes in the blood.

3. In monkeys infected with *T. rhodesiensis* the decreased blood sugar is restored to normal by an injection of suprarenalin.

4. The liver of a monkey which has died as the result of infection with *T. rhodesiensis* contains glycogen in great amount, so that the diminution in blood sugar cannot be due to lack of sugar forming substances.

5. The disturbance of sugar metabolism is much more readily explicable on the toxic action of the trypanosomes on the organs of importance for sugar metabolism.

W 1

SCHERN (Hurt) Zur Trypanosomenarbeit von Regendanz und Tropp. On the Trypanosome Work of Regendanz and Tropp. — *Cent. / Bakt.* 1 Abt. Orig. 1929 Feb 16 Vol. 111 No. 1/3 pp. 130-143

REGENDANZ (P) Erwiderung auf den Artikel von Schern "Zur Trypanosomenarbeit von Regendanz und Tropp" Bbl. 111 S.139 dieser Zeitschrift [Reply to the Article of Schern.] — *Ibid* 1929 May 23. Vol. 112. No 3-4 pp 319-320. [1 ref.]

These papers are polemical and are apparently the result of the article by REGENDANZ and TROPP (this Bulletin Vol. 24 p. 671) who hold that death in rats infected with trypanosomes is due to the action of toxins. After discussing the matter in considerable detail, Schern concludes that his own work and that which has followed it have provided proof that disturbance of sugar metabolism is a decisive factor in the pathogenesis of trypanosomiasis and spirochaetosis.

W 5

DE ALMEIDA (Eurico). A reacção de Maki Takata Kiyoshi-Ara e os graus de positividade no segundo período da doença do sono. [The Takata-Ara Reaction in the Second Stage of Sleeping Sickness.] — *Bol. de Assis Méd. aos Indígenas*. Lourenço. 1928. Dec Vol 2 No 12 pp 309-329 French summary p. 329

The Takata Ara test is a flocculation reaction obtained by adding to 1 cc. of cerebrospinal fluid one drop of sodium carbonate (10 per cent. solution) and 0.3 cc. of a freshly prepared mixture consisting in equal parts of 0.5 per cent. solution of corrosive sublimate and 0.03 per cent. fuchsin. The result is generally positive in nervous forms of syphilis and in acute meningitis. In this article the author records his results in 19 untreated cases of sleeping sickness in the stage of somnolence and tremor and in 47 patients presenting the same symptoms but undergoing treatment.

Brief details of each case are given and the results may be summarized by saying that in the untreated the reaction is positive and occurs usually within three minutes whereas in the treated the reaction is delayed up to half an hour and in some instances may be negative after 24 hours. The test is regarded therefore as a diagnostic aid in cases in the bush or in a district out of reach of laboratory investigations.

H. Harold Scott.

GALLIARD (H) De quelques causes influant sur l'évolution de l'infection mixte à trypanosomes et à tréponèmes. [Causes influencing the Development of Mixed Infection with Trypanosomes and Treponemes.]—*Ann Parasit Humaine et Comparée* 1929 Jan. 1 Vol 7 No 1 pp. 57-60 [5 refs.] [Parasit. Lab., Faculty of Med. Paris.]

In this work the author used *Trypanosoma brucei* (strain Mesnil) and various spirochaetes e.g. *Treponema duttoni* *T. hispanicum* and especially *T. crociduræ* which gives mixed infections of very long duration.

He has studied what causes are able to influence the evolution of a mixed infection in the mouse and rat. The inoculation at the chronic period of infection of spirochaetes or of various sera, has no influence on the course of the disease with the exception that the inoculation of trypanosomes obtained at the terminal period of a mixed infection leads quickly to death.

On the contrary the evolution of the disease is expedited and death follows quickly if the mixed virus is inoculated into animals not absolutely new. Such are mice and rats prepared by the injections of serum (especially human serum) or cured a long time previously of spirochaetal infection and no longer immune. Animals at the commencement of a spirochaetosis succumb rapidly on inoculation of the virus. The same applies for rats and mice infected with *Trypanosoma cruzi* and especially in the case of rats cured or infected with, *T. lewisi*.

It is not possible to explain in all cases the rapidity of the evolution by a diminution of the resistance of the host or by enfeeblement of the organism since one frequently sees the animals die of cachexia, of acute spirochaetosis or as the result of repeated hæmorrhages, without ever in these cases being able to attribute death to trypanosomiasis.

All that one can say is that trypanosomes and spirochaetes in the course of a mixed infection have lost their individuality have acquired certain peculiar properties and form an association in a state of unstable equilibrium. The equilibrium is broken if the virus is inoculated into an individual presenting any modification whatever of the reactions of the organism—modifications which do not lead to any alteration of the leucocyte formula—without there being necessarily any lessening of its resistance.

W Y

PEDRAZZI (Arrigo) Influenza delle spirochetosi ricorrenti sullo sviluppo di alcune tripanosomiasi. [Influence of Relapsing Fever on the Development of Certain Trypanosomiasis.]—*Arch. Ital. Sci. Med. Colon.* 1929 Feb 1 Vol. 10 No 2 pp. 59-71 English summary p 71 [Inst. of Trop Path. Univ. Bologna.]

The author has conducted an experimental research regarding the question of the influence of super infection of spirochaetes (*Sp. obermeyer*, *Sp. nocyi* and *Sp. duttoni*) in the case of trypanosomiasis (*T. brucei*, *T. evansi* and *T. maroccanum*) in rats and has reached the conclusion that the spirochaetal infection has no influence on the course of trypanosomiasis.

W Y

KIKUTH (W.) Ueber die Behandlung der menschlichen Schlafkrankheit mit "Tryparsamid." [Treatment of Human Trypanosomiasis with Tryparsamide.]—*Arch. f. Schiffs u. Trop. Hyg.* 1929 Jan. Vol. 30, No. 1 pp. 30-5 [43 refs.] [Inst. for Ship & Trop. Diseases, Hamburg]

This article is a summary of the results hitherto obtained with tryparsamide in sleeping sickness. It contains nothing new.

W. Y.

BAKUNIN (Luigi). Contributo allo studio della terapia della tripanosomiasi.—*Arch. Ital. Sci. Med. Colon.* 1929 Jan. 1 Vol. 10 No. 1 pp. 31-33. English summary pp. 35-36. ["Garibaldi" Italian Hosp. Rosario, Argentine.]

SHIMOGAKI (J. O.) Infection with Trypanosomes of the Cerebro-Spinal Fluid by Lumbar Puncture. [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928 Nov. 25 Vol. 22 No. 3 p. 301.

RABIES A REVIEW OF RECENT ARTICLES XI *

1. *Virus*. The question of the occurrence of rabies in South Africa has been referred to in various reviews (this *Bulletin* Vol. 24 p. 760 Vol. 25 p. 194). It will be remembered that though clinical and epidemiological evidence was not lacking in no case had a definite pathological diagnosis been made. This lacuna has now been filled, and HERZENBERG¹ reports that Dr BUCHANAN at the South African Medical Institute has demonstrated the presence of the virus in the brains of two boys bitten by a red meerkat (*Cynictis penicillata*) who died from typical rabies. In the brain of the first Negri bodies were not found but inoculation killed two rabbits in the brains of which the bodies were present. In the brain of the second atypical bodies were seen and again the animal test was positive with typical Negri bodies. Further sub-passages in both cases confirmed the diagnosis.

The more difficult problem of rabies in Equatorial Africa is further discussed by REMLINGER.² He recalls the fact that the character of paralytic rabies in the passage rabbit varies with the season that whilst the incubation period remains unaltered, the duration of the sickness is prolonged in the summer months. As would be expected, natural rabies in tropical climates differs considerably from that observed in temperate zones. Symptoms may be moderated, and fury may be rare. These differences do not, however imply a radical difference in the strains of the virus. REMLINGER and CURASSON have definitely proved the identity of the virus of oulou fato with that of rabies. REMLINGER, LEGER, and TEPPAZ have further shown that the street virus of Morocco behaves in exactly the same manner in Senegal and in Morocco as it does in Paris and that the fixed virus of Paris behaves exactly in the same way in Dakar and in Tangier as it does in Paris. BENNET (*Id Jour* March 1927) examined a virus from Kordofan which could not for various reasons have been imported from Europe. It was transmissible to man by natural infection and was in fact the ordinary virus of the street. In short no virus has so far been found whose virulence cannot be exalted by subpassage through rabbits and which cannot infect man and all the evidence is against its possible existence. REMLINGER rightly concludes that poly or auto-vaccines are a superfluous complication of antirabic treatment since there is no evidence of the existence in nature of plurality of strains of the virus.

Plurality of strain will no doubt continue to be brought forward as a reason for failure of treatment. For example TEODORASCU³ makes use of the hypothesis to explain four failures after treatment by Piscariu's and Högyes' methods. He claims that treatment with fixed virus did not develop an immunity against his strains and conversely that vaccination with his strains was ineffective against ordinary

* For the tenth of this series see Vol. 26 pp. 215-226

1 HERZENBERG (L.) Two Cases of Hydrophobia.—*Jl Med Assoc South Africa* 1928 Dec 22 Vol. 2 No. 24 pp. 659-661

2 REMLINGER (P.) Quelques considérations sur la rage et le traitement antirabique dans les pays tropicaux.—*Bull Soc Path Exot* 1928. Nov 14 Vol. 21 No. 9 pp. 790-797 [10 refs.]

3 TEODORASCU (C.) Etudes expérimentales sur la virulence particulière de deux souches de virus rabiques.—*C R Soc Biol* 1929 Apr 8 Vol. 100 No. 11 pp. 929-930

fixed virus when tested experimentally on rabbits. Before accepting his thesis one would require to be convinced as to the validity of the conclusions which he has drawn from his experiments. This would necessitate a fuller treatment than is given in his paper.

CALDERINI⁴ has examined a strain of virus obtained originally from a cow which after 35 passages (19 through guinea-pigs, 6 through rabbits, and again 10 through guinea-pigs) attained a virulence such that it could kill a guinea-pig on the fourth day. This hypervirulence was maintained after 26 further passages through guinea-pigs. The virus so modified, preserved its virulence after being kept in 30 per cent. glycerine for 20 to 25 days. The author considers that this exaltation of virulence depended upon some inherent character which was present initially (i.e. in the cow) and that it was not a result of the subpassages through the guinea-pig. He has treated other strains of street virus in a similar manner and in none of these even after many subpassages, has he observed death of the guinea-pig in less than 5 days. These observations in his opinion confirm PINTONI's views regarding plurality of strains.

MANOCELLI and VIALA⁵ starting from the well-known fact that Negri bodies are seldom seen in the spinal cord, whilst the virulence of this tissue proves that the virus is present, assume that the Negri body is an evidence of a defensive action of the nerve cells against the virus and that the cells of the spinal cord are not so reactive as those of the hippocampus major. This reaction causes the germs to agglomerate into compact masses with the rough outline of Negri bodies which with further development assume the rosette form of the typical body. Where there is little reaction the parasites may be abundant but they remain in a diffuse condition. In fixed virus rabies there is no difference between the appearances seen in the cord and in the hippocampus. The virus is abundantly present in the cord of the dog, each section showing cells filled with small scattered parasites. In rabbits both with street and fixed virus considerable numbers may be observed. In suitable preparations the parasites may be so abundant that the cytoplasm and dendra of the cells stand out against a blue background. In the case of street virus agglutination may be observed.

GERLACH and SCHWEINBURG⁶ submit an analysis of the presence of Negri bodies in the brains of 56 persons who died of rabies at the Vienna Institute during the years 1916-1928. Of these 33 were of untreated persons. In 30 of this number (86 per cent.) Negri bodies were found. In the case of the remaining five three of the brains were in a decomposed condition and in two the hippocampus could not be found. Twenty were from treated patients. These may be divided into two groups, (a) those who died within 14 days after completion of treatment and (b) those who died at a later period. Nine brains related to the former class, and in 6 of these (66 per cent.) Negri bodies were present. 12 to the latter and in this group 5 showed bodies (42 per cent.) To test the significance of this variation

⁴ CALDERINI (V.) 1 caso di eccezionale esaltazione della virulenza del virus rabbico nella cavia.—*Giorn. d. Bacteriol. Immunol. Turin*. 1929. 3 de 13. No 8. pp 429-434. 10 refs.]

⁵ MANOCELLI (A.) & VIALA (J.) La moelle épinière le bulbe le protuberance et le pons: de la rareté.—*C.R. Acad. Sci.* 1928. Dec. 10. Vol 187. No 1. pp 1168-1170.

⁶ GERLACH (F.) & SCHWEINBURG (F.) Ueber den Einfluss der Lymschichtimpfung auf die Entwicklung der Negri'schen Körperchen.—*Cent. f. Bakt.* 1. Abt. Orig. 1929. Vol 110. No 8 B. pp 159-181.

experiments were carried out on rabbits. A group of 8 received a 13 days course of treatment by Högyes method the test dose of street virus being administered on the first day of treatment. Four out of the eight showed Negri bodies, usually small in size, whilst in untreated controls bodies of all sizes and forms were present. A further series received their test dose 8 and 14 days after the commencement of treatment. Five out of 9 showed no Negri bodies but a few coccal forms two showed numerous definite bodies and one a few small bodies. The controls as before showed numerous bodies of all shapes and sizes. When the infecting dose was given at a still later date the difference was still more marked. The authors believe that this adds further support to the theory of the parasitic nature of the Negri bodies, that the coccal forms are early stages in the development of the parasite which later develops into the mature body.

KRITSCHESKY⁷ finds that a 10 per cent. glycerine emulsion of the Berlin fixed virus kept on ice retains its virulence for three months (as tested by intracerebral inoculation) and that the Berlin vaccine can well withstand such temperatures as it may be submitted to during transit to treatment centres in Germany. The emulsion diluted to 1 in 25 for use as a vaccine, can safely be kept on ice until the evening.

In a previous communication (this *Bulletin* Vol. 24 p. 765) HERRMANN⁸ showed that loss of virulence is not always proportional to the period of desiccation nor to the time of preservation in glycerine. He comes to a like conclusion from a further series of experiments on 22 rabbits which had been inoculated with cords which had been kept in glycerine on ice for long periods. After 5 months preservation one (incubation 10½ days) out of three succumbed after 9 months two (6½ and 8½ days) out of three after 11 months three (9, 53 and 54 days) out of three after 12 months two rabbits showed symptoms of recurrent rabies and both survived after 12½ months three out of three survived. These experiments were carried out with pure sterilized glycerine.

The attention of those who are interested in neurotropic viruses in general is drawn to a full paper by NICOLAU DIMANCESCO-NICOLAU and GALLOWAY⁹. In this the pathology of Borna's disease herpes vaccinia polymyelitis and rabies are fully described. The conclusions with regard to rabies mainly have reference to its well known neurotropic characters.

ii. *Symptoms* A case of recurrent rabies in the dog is reported by CHINI¹⁰ which in the first subpassage gave rise to recurrent symptoms in the rabbit. The details are as follows. The dog exhibited ocular symptoms with paresis of the legs and change in disposition. It was kept under observation and after 24 hours had so far recovered that

⁷ KRITSCHESKY (N. L.) Die experimentelle Begründung der Berliner Methode der antirabischen Impfungen.—*Ztschr f Immunitätsf u Experim. Therap* 1929 Vol 60 No 5/6 pp 337-345 [10 refs.] [State Microbiol Inst. Rostov on Don.]

⁸ HERRMANN (Otto) Ueber den Virulenzverlust des in Glycerin konservierten fixen Virus.—*Cent f Bakt I Abt. Orig* 1929 Jan. 2. Vol. 110 No 1/3 pp 45-47 [7 refs.] [State Inst for Med. Research, Kasan.]

⁹ NICOLAU (S.) DIMANCESCO-NICOLAU (O.) & GALLOWAY (I. A.) Etude sur les septinévrites à ultravirus neurotropes.—*Ann Inst Pasteur* 1929 Jan. Vol 43 No 1 pp 1-88 With 41 figs. & 2 coloured plates. [Numerous refs.] [Pasteur Inst. Paris & National Inst. for Med. Research, London.]

¹⁰ CHINI (Virgilio) Osservazioni sulla cosiddetta rabbia ricorrente.—*Ann d'Igiene* 1928 Dec Vol 38 No. 12, pp 1002-1011 [22 refs.] [General Med. Clinic Univ Padua.]

it was set free. After two days it became restless with attacks of excitement. It was then killed. The brain was examined and Negri bodies were found. A rabbit was inoculated with an emulsion of the dog's brain. On the 15th day symptoms of paresis were observed, from which it soon recovered. On the 26th day symptoms reappeared, and it died on the 29th day after having been typically paralyzed. Negri bodies were present in its brain. Further passages were carried out both with the dog's brain and with the rabbit's brain. In each case virulence was lost at the 3rd passage. The virus was atypical in that incubations were prolonged, and that with successive subpassage virulence diminished. The author is of opinion that this is a peculiar strain of virus, and that PENTON'S views as to the plurality of strains are further supported (*ante* page 726).

WEBB and MILLER¹¹ describe in detail the clinical and pathological aspects of two cases of human rabies, and RICE¹² deals with two cases which contracted the disease in spite of treatment by Harris's method.

iii. *Diagnosis* BOHLS¹³ recommends the following staining method for the rapid demonstration of Negri bodies —

A solution containing 0.9 gm. of Methylene blue 1.5 gm. of Rosaniline violet, 125 cc. each of Glycerine and Methyl alcohol, is mixed, shaken and allowed to ripen. Impressions of the hippocampus are prepared, and to these a mixture containing 10 drops of the above staining fluid in 20 cc. of 1 in 50 000 KOH is applied for two minutes with heating. The preparation is dried and examined. Negri bodies take the acid stain. The solution must be freshly prepared.

iv. *Pathology* The infectivity of salivary glands before the appearance of symptoms has been further examined by JONESCO and TEODOSIO.¹⁴ Ten dogs were inoculated subdurally with street virus. On the succeeding day a salivary gland was excised from each dog, emulsified, and inoculated subdurally into a rabbit. In 4 cases the gland proved virulent, that is to say it had become virulent seven days before the appearance of rabies in the dog. In five cases it was avirulent but in each case the dog did not develop symptoms of rabies for more than seven days after the gland was excised.

Starting from the assumption that immunity against rabies is a tissue immunity DE-GEORGES¹⁵ has examined the effects of certain substances (alcohol, carbolic acid) which exercise an influence upon the haemato-encephalic barrier by opening the path of penetration of the vaccine into the nervous tissue. A group of control rabbits received 1 to 2 cc. of fresh fixed virus in a dilution of 1 in 150 in normal salt solution.

¹¹ WEBB (L. R.) & MILLER (F. W.) Rabies. Report of Two Cases.—*U.S. War Med. Bull.* 1929. Jan. Vol. 27 No. 1 pp. 93-111.

¹² RICE (Thurman B.) Two Human Cases of Rabies.—*Jl Amer Med. Assoc.* 1928. Nov. '24 Vol. 91 No. 21 pp. 1631-1632.

¹³ BOHLS (S. W.) The Walthe Stain for Negri Bodies.—*Jl Lab. & Clin. Med.* 1928. Jan. Vol. 14 No. 4 p. 379.

¹⁴ JONESCO (Demetru) & TEODOSIO (V.) Passage d virus rabique dans les glandes sous-maxillaires chez le chien.—*C.R. Soc Biol.* 1929. Apr. 8 Vol. 100 No. 11 pp. 897-898.

¹⁵ DE-GEORGES (L.) Valeur de la barrière hémato-encéphalique dans l'immunisation contre la rage.—*Rev Microbiol. Epidémiol. et Parasit.* 1928. Vol. 7 No. 4. pp. 360-367 [23 refs.] [In Russian. French summary p. 457.]

intravenously. A second group received the same dose of vaccine but had been injected previously with 2 cc. of a solution of 2 per cent. carbolic acid, or of 25 per cent. alcohol also intravenously. These manipulations were repeated on two or three occasions with intervals of seven days. A month later all received an infecting dose of fixed virus. Of these 5 died during immunization and 6 of shock. The subsequent history of the remaining 50 was as follows —

	Number of rabbits	Survived.
Controls	23	5
Treated with Alcohol	9	5
Treated with Carb. Acid	18	10

The author concludes that these substances by diminishing the normal resistance of the barrier increased the immunizing effect by about $2\frac{1}{2}$ times.

In view of the fact that Indian ink injected *in vivo* acts on the reticulo-endothelial system in such a manner that the endothelial cells of the capillaries become specifically impregnated by the stain MARIE¹⁶ has examined the effect of such treatment upon infectivity of fixed virus introduced intramuscularly. The results of controlled experiments upon 42 mice were very contradictory and the author concludes that sometimes the ink blocks the reticulo-endothelial system and sometimes it fails to do so.

JONESCO and VALTER¹⁷ have examined the effects of splenectomy in rabbits both upon the course of rabies infection and upon the blood changes during rabies. The observation was carried out on 10 rabbits and had no effect upon the course of the disease. The leucocytosis was rather more intense in splenectomized than in control animals, but otherwise there was no essential difference.

FERRI and LUMBAU¹⁸ compare the rabicidal with the immunising power of various anti-rabic sera. The rabicidal power is measured in terms of the proportion of serum which is necessary to neutralize 1 cc. of a 1 per cent. emulsion of Sassari fixed virus tested by subcutaneous injection of 0.25 cc. of the mixture, after 24 hours contact into white and grey mice. The immunizing power is determined as follows. Mice are infected by a subcutaneous inoculation of fixed virus under the skin, and after a certain period (24, 48, 72, 96 hours) a series of inoculations of the test serum (2 inoculations daily of 0.25 cc.) is commenced. A potent serum is found to be efficient even when the commencement of treatment is delayed for 96 hours after the animal has been infected. The strength of the serum is

¹⁶ MARIE (A. C.) Virus rabique et encro de Chine — *C. R. Soc. Biol.* 1929 May 13 Vol. 101 No. 15 pp. 6-7

¹⁷ JONESCO (Demetre) & VALTER (V.) Recherches expérimentales sur la splénectomie dans la rage — *C. R. Soc. Biol.* 1929 Apr. 8 Vol. 100 No. 11 pp. 890-900

¹⁸ FERRI (C.) & LUMBAU (Dello) Gibt es eine beständige Beziehung zwischen dem rabiciden Vermögen der antirabischen Seren und ihrem Immunisierungsvermögen? Zusammenfassung — *Cent. f. Bakt. I. Abt. Orig.* 1929 Mar. 8. Vol. 111 No. 4/5 pp. 242-244

indicated by the period of delay after which its administration is still able to save the animal. The results may be summarized as follows —

Rabidical power	Period of delay
1 10	96 96
2 10	48, 96, 96, 96, 84
3 10	96 0 72, 84 48, 84 72, 84, 84.
4 10	72, 48, 72, 84 72
5 10	72 72, 72, 72, 84 84 84
6 10	72 48.
7 10	24
8 10	0
Serum from normal horse	0

Each of the figures in the second column of the above table refers to a particular serum. The number of experiments carried out to determine these values is not given.

It is stated that the dose of the Sassari fixed virus employed, and administered subcutaneously causes certain death. Two of the sera employed were withdrawn from human subjects one 15 days, and the other 4 days after completion of a 30 days course of treatment by Fermi's method. Both of these had rabidical powers of 2 10, and both protected after a delay of 96 hours.

v *Methods of Treatment* As a result of the discussion at the International Conference, interest has been aroused regarding the effects of the various procedures which have from time to time been adopted in the production of vaccines. FERMI¹⁰ examines the correlation between virulence of the strain of fixed virus employed and its immunizing action. He compares a virulent with an avirulent strain both as regards their protective properties when employed as a vaccine, and as regard the quantity of antibodies which they give rise to. A vaccine made with the virulent strain saved 8 out of 11 whilst one made with the avirulent saved 4 out of 12 animals of various type and variously treated. Also the virulent strain gave rise to a serum which was able to save mice when administered 72 hours after infection, whilst the avirulent was only operative when given within 48 hours. The rabidical power of serum produced by the virulent was in the proportion 4 10 whilst that from the avirulent was in the proportion 6 10. A repetition of this experiment gave a very similar result. Thus, he concludes that the Sassari virus, which is highly virulent gives a more powerful vaccine, and calls forth a greater antibody response than does an avirulent strain. In a second paper FERMI¹¹ examines the effect of heating carbolized virus at 37° C. for 24 hours as is the characteristic of Semple's method. He refers to his experiments on this point which I have already quoted (this Bulletin Vol. 25, p 711) and adds the following further experiment. Twenty-four mice were

¹⁰ FERMI (Claudio): Beeinflusst die Virulenz des fixen Virus die immunisierende Wirkung des antirabischen Impfstoffes und die Produktion des Antikörpers?—*Zeitschr f Immunitätsf u. Experim Therap* 1929 Vol. 58, No 3-4 pp 276-279

¹¹ FERMI (Claudio): Beeinträchtigt die Erhitzung des karbolisierten Impfstoffes auf 37° C während 24-72 Stunden die Wirksamkeit desselben?—*Zeitschr f Immunitätsf u. Experim Therap* 1929 Vol. 58 No 3-4 H 284-284 [2 refs.]

Infected with fixed virus and three days later 12 of them received a three-day treatment of 3 daily doses of 0.25 cc. of carbolyzed vaccine kept at 37° C. The remaining 12 were treated similarly with carbolyzed virus which had been kept at 20° C. Of the former 6 died of rabies, of the latter all survived. He concludes that Semple's vaccine is less active than his own and quotes statistics of treatment showing that the mortalities at Institutes where his unheated vaccine is used are zero (Messina, Chicago and Santa Clara) and 0.16 per cent. (Rome), whereas with Semple's vaccine they vary from 0.32 to 1.23 per cent. Omsk, Kasauli, Coonoor Bombay Calcutta Shillong, Rangoon Shanghai and Jerusalem). It will be observed however that all the latter group of Institutes are in Asia (*see this Bulletin* Vol. 25 p. 712). We must correct a statement of FERMI's that at Kasauli a return has been made to FERMI's original method. This is not the case. In a further paper FERMI²¹ contrasts experimental results upon mice and rats with his carbolyzed vaccine and with glycerine vaccine. His results may be summarized as follows —

	Carbolyzed vaccine	Glycerine vaccine
Survived	62	44
Died of Rabies	28	46

The probability that a disagreement equal to or greater than the observed might arise from random causes is of the order of 1 in 100.

FERMI²² regards phenol as the best antiseptic for use in preparing vaccines. The phenol has no immunizing properties *per se* it does not, as employed in his method, reduce immunizing properties and in the doses used it is non toxic.

TORRES²³ following SCHNÖRER and DAVID and DE GEORGES (this *Bulletin* Vol. 24 p. 769 and 229 respectively) has found that sera of guineapigs treated on 8 consecutive days by percutaneous application with friction of a phenol glycerinated vaccine and withdrawn 23 days after the last dose if used in sufficiently high concentrations, are capable of inactivating fixed virus. Normal guineapig serum had no inhibiting action.

²¹ FERMI (Clandio) Karbol oder Glycerinimpfstoffe gegen Wut.—*Ztschr f Immunitäts u Experim Therap* 1929 Vol. 61 No 1/2 pp. 91-98 [2 refs.]

²² FERMI (Clandio) Il fenolo è ancor sempre il migliore antisettico nella preparazione del vaccino antirabbico di cui aumenta pure l'efficacia.—*Polidinico Sex. Prati* 1929 Feb 4 Vol. 36 No 5 pp 153-155 [5 refs.]

— La dose giornaliera di fenolo iniettata col vaccino antirabbico fenicato non è tossica.—*Ibid.* pp 155-156 [6 refs.]

²³ FERMI (Clandio). Welches ist gegenwärtig das beste Antiseptikum bei der Herstellung des Impfstoffes gegen die Wutkrankheit?—*Ztschr f Immunitäts u Experim Therap* 1929 Vol. 60 No. 5/6 pp 377-380 [5 refs.]

²⁴ TORRES (Sylvio) Contribuição ao estudo da imunidade local na raiva. O soro das cobaias vaccinadas por via dermica contém substancias rabicidas?—*Rev Zootecnia e Vet* 1928. Vol. 14 No 3 pp. 197-201

²⁵ PONOMAREW (A. W.) & SOLOVIEV (N. N.) Une nouvelle méthode de préparation de vaccin antirabique et un essai d'utilisation de ce vaccin pour la préparation d'un sérum antirabique d'une activité élevée.—*Arch. Sci Biol* 1928 Vol. 28. No 3 pp. 325-334 [31 refs.] [In Russian French summary pp 376-377]

An attempt has been made by POXOMAREW and SOLOVIEV²⁶ to remove as much nervous tissue as possible from vaccinal material with the object of reducing its toxic action. The procedure is as follows—

A 1 per cent. emulsion of brain substance is kept on ice for some hours, the supernatant fluid is decanted, and to it is added one-quarter of its volume of liquid paraffin. The mixture after having been shaken for one or more hours, is centrifuged for 30 minutes. A feebly opalescent fluid is obtained, above and below which are layers of nervous debris. This transparent fluid is pipetted off. The liquid paraffin is then replaced by ether and separated off by centrifugation.

With this vaccine horses have been hyper-immunized. No neurotoxins are formed as heterologous brain substance has been as far as possible removed. The serum of horses so treated is highly active. It neutralized 1 per cent. fixed virus in dilutions of 1:1000 to 1:3000. Ten cubic centimetres injected intravenously prevented rabies in 50 per cent. of rabbits which had received 1 to 2 lethal doses of fixed virus suboccipitally and 20 cc. saved 70 per cent.

The method of treatment employed by STUART and KRIBORIAN²⁷ at Jerusalem is that of SEMPLE, modified in that the primary emulsion which is heated with 1 per cent. phenol at 37° C. for 24 hours, is of a concentration of 8 per cent. brain substance, whereas in Semple's procedure a 2 per cent. emulsion is employed. With a dosage of 0.28 gm. of brain substance (1923-1924) 9 out of 748 treated persons died, whereas with a dosage of 0.7 gm. (1924-1928) 5 out of 2,412 developed rabies. The following experiments regarding the effects of carbolization (as above described) are instructive—

No. of Rats	Daily dose of 2 per cent. Vaccine	Died.	Survived.	Percentage Immunity
10	1 cc. carbolized	5	5	50
10	1.5 cc. carbolized	2	8	80
10	2 cc. carbolized	4	6	60
8	2.5 cc. carbolized	5	3	37
9	1 cc. in saline	3	6	66
10	1.5 cc. in saline	2	8	80
10	2 cc. in saline	4	6	60
8	2.5 cc. in saline	3	5	62

The effect of carbolization (as above described) is inappreciable: the highest degree of immunity in each case was obtained with doses of 1.5 cc. i.e. 750 mgm. per kilo of body-weight.

They then compared the two methods of treatment in respect of the rabid activity of the sera of animals so treated, and found that whilst with uncarbolized vaccine, a demonstrable effect could be detected 12 days after completion of treatment, and a maximum (1 unit neutralized 16 units of 1 per cent. fixed virus) was attained about the 38th day with carbolized vaccine the maximum was lower (1 unit

²⁶ POXOMAREW (A. W.) & SOLOVIEV (N. N.). Nouvelle procédé de la préparation du vaccin antirabique et essai d'application de ce vaccin pour l'obtention d'un sérum antirabique de haute activité.—*Ann. Inst. Pasteur* 1928 Dec. Vol. 42, No. 12, pp. 1661-1671 [18 refs.] (text of *Expériment. Med. Leningrad.*)

²⁷ STUART (G.) & KRIBORIAN (K. S.). Studies in Anti-Rabies Immunization.—*Jl. of Hyg.* 1929 Apr. Vol. 29, No. 1, pp. 1-34. With 1 chart in text. [61 refs.] (Dept. of Health, Palestine.)

neutralized 8 units) Using the sera obtained by both methods of treatment and alcoholic brain extract as antigen they were unable to demonstrate any complement binding activity. From experiments on 70 rabbits in batches of 10 in which carbolized vaccines were heated at 37° C. for periods varying from 26 to 168 hours it appeared that the vaccine became avirulent after 144 hours exposure to heat. A further interesting series of observations was made to determine how far distribution of dosage influenced the efficacy of treatment. Four rabbits received a treatment of 2 cc. daily for 14 days (in all 200 mgm. per kilo of body weight) four received doses of 4 cc. for 14 days (400 mgms. per kilo) four received doses of 6 cc. for 10 days (430 mgm. per kilo) four received doses of 15 cc. for 3 days (320 mgm. per kilo) and four received a single injection of 30 cc. (214 mgm. per kilo) Unfortunately the table cited in the text has dropped out in publication but the authors state that better results followed a 14 days treatment with a small daily dose than larger doses given over a shorter period.

Reference may here be made to an observation by FERRAN²⁶ of a similar nature. He found that mice which received 15 cc. of vaccine during a period of 30 days were more refractory than others which received 30 cc. during a period of 6 days. From this and other experiments he concludes that short intensive treatments with live vaccines are not only less effective, but may also be dangerous.

In another experiment he treated 10 dogs with 6 5 4 3 1 and 0 day dried cords at half-hourly intervals, and subsequently tested them with street virus. All died of rabies seven of them from the fixed virus contained in the vaccine.

In the final section of their paper STUART and KRIKORIAN²⁷ consider the applicability of living fresh virus to treatment. Fresh virus is admittedly unsafe but at the same time it has immunizing properties. FERRAN (1888) was of opinion that large doses were not so dangerous as small. The authors in the first place treated a number of rabbits with varying numbers of daily doses each of which was 5 cc. of a 2 per cent. suspension of fixed virus in physiological salt solution. The results of three consecutive experiments were as follows —

	No of Rabbits.	No of Daily doses	Died.	Survived.	Percentage deaths
Expt. I	5	5	3	2	60
	5	10	0	5	0
Expt. II	5	5	3	2	60
	5	10	0	5	0
Expt. III	5	7	2	3	40
	5	14	0	5	0

This suggested a further determination of the smallest number of daily doses which caused infection, and the smallest number which established complete immunity. For this purpose the following experiment was carried out, in which each dose was again 5 cc. of a 2 per cent. fixed virus in saline.

²⁶ FERRAN (Caudlio). Ueber die Wirkung der anthrabischen intensiven und verlängerten Impfungen.—Ztschr. f. Immunitätsf. u. Experim. Therap. 1929 Vol. 59 No 3/4 pp 285-287 [5 refs.]

	No of Rabbits.	No of Daily doses.	Died.	Survived.	Percentage deaths.
Series 1	5	1	0	5	0
2	5	2	4	1	80
3	5	3	2	3	40
4	5	8	0	5	0
5	5	9	0	5	0
6	5	10	0	5	0

The results are strikingly uniform and the authors conclude that the effect on rabbits of subcutaneous injections of living virus is dependent on the quantity administered, and the duration of the period of its administration. Few inoculations are more likely to cause death than several. As deaths from fixed virus administered subcutaneously occurred in 11 or 12 days from the commencement of treatment, the immunity which was acquired must have been produced within that period.

The last paper of this group is by FERMI,²⁹ and deals with destruction of the virus at the seat of inoculation. He has found that injection of 1 in 10 000 sublimate 1 in 1 000 silver nitrate 1 in 5 000 Tachyol, 1 in 1 000 Ichthargan, 1 in 200 protargol, 2 in 100 phenol, and 1 in 200 methylene blue solutions can save rats with certainty if performed immediately but if delayed for 15 minutes the treatment is ineffective. He also found that absorption of the virus through the healthy nasal and rectal mucus membrane is so rapid that after 15 minutes none can be saved by thorough douching with thymol sublimate. Local treatment after 15 minutes with 2 per cent. phenol or with 1 per cent. sublimate solutions are alike ineffective. Dipping in 20 to 50 per cent. nitric acid ("Nitricasure") was more effective than either cauterization or other antiseptics. Amputation of the tail seemed to be effective when performed even 5 hours after the tip was infected. Bier's hyperaemia saved all animals (rats rabbits and dogs) when induced 4 hours after the infection. The hyperaemia was more effective than cauterization. With the former treatment 3/4 of the rabbits tested were saved, with the latter half were saved.

v. Statistics The statistics of anthrax vaccination in Germany for the year 1928 are reviewed by HESSE³⁰ according to the scheme which on the recommendation of the International Conference has been adopted by the League of Nations. In all, 378 were treated, all of whom were Europeans. At one institute (Breslau) Semple's vaccine is used. The other institutes all employ the method of Högyes-Phillips. The figures may be summarized as follows—

	Vaccine		
	Semple's	Högyes-Phillips.	Totals.
Died	0	2	2
Survived	136	238	374
Totals	136	240	376

²⁹ FERMI (Glandhof) Ueber die Lokalneutralisierung des Virus rabies — *Zentralblatt f. Bakt. I. Abt. Orig.* 1929 May 10 Vol. 112, N. 1/2, p. 72.
³⁰ HESSE (Ersch.) Die Tätigkeit der deutschen Versuchsanstalten im Jahre 1928 — *Reichs-Gesundheitsblatt* 1929 May 8. Vol. 4 No. 19 pp. 380-383.

These figures afford no significant evidence in favour of either method of treatment. On the assumption that the two groups were samples of the same population and that the two methods of treatment were equally effective figures such as the above would be quite likely to occur as the result of chance. As figures accumulate during ensuing years it may be possible to assess the relative efficacies of the two methods. At present all one can say is that there is no evidence of inequality.

TSEN²¹ reports that at the Peking Institute treatment by dried cords was employed from 1919 to 1923 whilst from 1923 to 1927 both dried cords and Semple's vaccine were used, and since the latter date Semple's treatment has been employed for all cases. He states that the mortality rates have not altered throughout the period.

OUCHAKOW²² states that at the Institut de Médecine expérimentale three deaths occurred amongst 1 192 persons (0.25 per cent.) treated with Fermi's vaccine. Two cases of paraplegia were observed, one of which was fatal. The brain of the latter person did not infect rabbits.

GLOSTER²³ from Coonoor reports four deaths amongst 394 persons treated at the institute, and 45 out of 4 788 treated at out centres with Semple's vaccine.

From Kasauli MALONE²⁴ reports 105 deaths amongst 6 041 Indians (a mortality of 1.74 per cent.) and 0 deaths amongst 281 Europeans treated at the Institute. Reports regarding the state of health after 6 months of 82 per cent. of the patients have been received. The treatment employed for cases of lesser severity was that of Semple for those of greater severity ether vaccines were employed. Details of the methods the populations at risk and the relative results of the two types of treatment are being prepared in accordance with the resolution of the International Conference and will be published later. A case is reported in which the patient died from hydrophobia 11 days after having been bitten on the bare skin of the foot and 6 days after the commencement of treatment. The method of treatment employed is not stated.

VII. *Paralytic Accidents.* A case of paralytic accident in an experimentally infected dog is described by MARKOWSKI and LEGEZYNSKI²⁵ in which symptoms in the forelegs and in the neck appeared 12 days after infection and 10 days after commencement of treatment. Death supervened after six days. Negri bodies were not found in the brain. Nine rabbits inoculated with nerve substance all died of a pasteurilla infection in 16 to 20 hours.

²¹ TSEN (Edgar T. H.) & CHI (C. C.) The Preparation and Use of Phenolized Rabies Vaccine.—*Nat Med Jt China* 1928 Dec. Vol. 14 No 6 pp 402-409 [6 refs.] [National Epidemic Prevention Bureau, Peking.]

²² OUCHAKOW (W. G.) Service antirabique de l'Institut de Médecine expérimentale. (Rapport annuel pour 1927).—*Arch Sci Biol* 1928 Vol 28 No 3 pp 313-324 [In Russian. French summary pp 375-376.]

²³ COONOOR, SOUTHERN INDIA. Pasteur Institute. The Annual Report of the Director [GLOSTER (T. H.)] together with the Twenty First Annual Report of the Central Committee of the Association for the Year ending 29th February 1928.—33 pp 1928 Madras.

²⁴ KASAUILL. Pasteur Institute of India. The Twenty Seventh Annual Report of the Central Committee of the Association and the Audited Accounts up to June 30th 1928. Also the Report of the Director of the Institute for the Year ending 31st December 1927. Part II. [MALONE (R. H.) Off. Director].—61 pp.

²⁵ MARKOWSKI (Sigmund) & LEGEZYNSKI (Stanislaw). Sur un cas de paralysie postvaccinale chez un chien.—*C R. Soc Biol* 1929 Feb 1 Vol. 100 No 4 pp 291-292. [1 ref.]

viii. *Rabies in Animals.* BOUGHTON²⁶ describes the methods of control which have been adopted at Port-au-Prince, in the island of Haiti. Since 1926 stray dogs have been impounded and, if unclaimed, destroyed. Private dogs may not be taken on to the streets except when muzzled or on the leash. Latterly all private dogs have been licensed, and vaccinated. Rabies in dogs is a notifiable disease, and suspects are isolated. During the year 1926-27 367 dogs were vaccinated by Umeno and Dot's method, 38 brains were examined for Negri bodies, 19 of which were positive, and 2,962 unclaimed dogs were destroyed. Two of the 367 vaccinated dogs contracted rabies.

During the year 1927-1928, 347 dogs were vaccinated, 19 brains were examined of which 12 were positive, and 1,670 unclaimed dogs were destroyed.

According to STANHOPE²⁷ rabies is less prevalent in Malaya than in India and Siam. This he ascribes to the absence of the jackal, and to the lack of religious difficulties regarding the destruction of dogs. The Zengala, or wild dog of this country is rarely seen. An outbreak of rabies is at present occurring in Negri Sembilan, and 37 cases of rabies in animals have been reported since 1928. Dogs are registered, and taxed. During 1928 9,000 unregistered dogs were destroyed. 520 dogs have been treated by the Japanese method with encouraging results. Local quarantine measures between the different states are discussed.

REMLINGER and BAILLY^{28, 29} contribute an interesting study of rabies in the cock. Eleven cases of rabies in experimentally infected cocks are described in detail, and the pathological changes which were observed are discussed. In one which was bitten on the crest by a dog, symptoms of inco-ordination developed after 83 days, a week or so later amelioration was noted, and after about 120 days the animal recovered. It was noted that salivation is a frequent symptom in the cock. Five experiments were made to see whether transmission from bird to bird was possible by the peck of the beak, and in one of these a successful transmission followed. The research was undertaken on hearing of two cases where human beings had been pecked by enraged cocks. It would seem that the vaccinator must be prepared for the occurrence of such cases.

Four cases of rabies in horses are described by FINK and MALKY³⁰. One of these was characterized by hypersensitivity of the skin, and twitching at the site of the bite.

²⁶ BOUGHTON (I. B.) Rabies Control in Port-au-Prince, Haiti.—*Jl. Amer. Vet. Med. Assoc.* 1929 May Vol. 74 New Ser. Vol. 27 No. 6. pp. 621-674.

²⁷ STANHOPE (R. A. B.) Rabies in Malaya.—*Vet. Rec.* 1928. Nov. 4 Vol. 8. No. 47 pp. 999-1004 [3 refs.]

²⁸ REMLINGER (P.) & BAILLY (J.) La rage du coq.—*Bull. Acad. Méd.* 1929 Jan. 22 Year 83 3rd Ser. Vol. 101 No. 3 pp. 103-109 [3 refs.]

²⁹ REMLINGER (P.) & BAILLY (J.) La rage du coq.—*Ann. Inst. Pasteur* 1929. Feb. Vol. 42 No. 2 pp. 153-167 [1 ref.]

³⁰ FINK (Zdzislaw) & MALKY (Stanislaw) Zur Kasuistik der Tollwut bei Pferden.—*Beitr. Tierärzt. Week* 1929 Jan. 11 Vol. 45 No. 2 pp. 20-22 [5 refs.] [Vet. High School, Lemberg.]

⁴¹ BHOOT (A.) EYRAUD (R.) & VELU (H.) Nouveaux essais de vaccination antirabique préventive du chien.—*Bull. Acad. Vét. de France* 1929. Jan. Vol. 2 pp. 81-88. [4 refs.]

⁴² VELU (H.) BHOOT (A.) & EYRAUD (R.) Au sujet de la vaccination préventive des chiens contre la rage.—*C.R. Soc. Biol.* 1929, Dec. 14. Vol. 95. No. 36 pp. 1774-1776 [2 refs.]

BIGOT EYRAUD and VELU^{41 42} claim that if vaccination by the Japanese method is followed three weeks later by a small injection of fresh fixed virus a solid immunity is conferred which lasts for 5 or more months. A repetition of this living dose converts this immunity into a hyper immunity. These conclusions are based on an experiment on 12 dogs, inoculated at the first instance with 5 cc. of carbolized vaccine subcutaneously on the abdomen. The subsequent living dose was 5 cc. of fresh fixed virus. A series of test inoculations was made each thoroughly controlled, with the result above stated.

KARMANN⁴³ compares the immunizing potencies of Fermi's Umeno and Doi's and Miessner's Lyssin vaccines. From controlled experiments with the three methods he concludes that single doses give a definite immunity. With Fermi's vaccine three out of four survived with the Japanese method six out of six with Lyssin six out of six, whilst of untreated controls one out of four survived the test dose being given 67 days after treatment. In a second experiment the test dose was given after 179 days and in this case with Fermi's vaccine three out of four survived, with the Japanese vaccine nine out of nine with Lyssin nine out of nine whilst of the untreated controls four out of six survived. In a third experiment in which Lyssin was alone employed, 23 out of 29 treated dogs survived a test dose given 86 days later whilst of the untreated two out of thirteen survived.

MARGINESU⁴⁴ has treated 47 dogs by the Japanese method 20 with a single dose and 27 with three injections of 3 to 5 cc. according to weight. The author observed no ill-effects from the treatment and none of the dogs acquired rabies during the succeeding six months. He was unable to demonstrate any rabicidal action in the sera of any of these animals.

MARKOWSKI and LEGEZYNSKI⁴⁵ examined the curative value of Fermi's vaccine on artificially infected dogs. The infecting dose was 5 to 6 cc. of 1 per cent. street virus. Of 8 dogs whose treatment commenced 45 hours after the infective dose was given 4 resisted, whilst of 4 untreated dogs and 4 untreated rabbits all died of rabies. Of 8 dogs whose treatment was commenced 21 hours after infection 5 resisted, whilst of 4 untreated dogs one survived, and of 4 untreated rabbits all died.

REMLINGER and BAILLY^{46 47} describe in detail their experiences of vaccination of dogs in Morocco by Remlinger's ether vaccines (this

⁴³ KARMANN (P) Zur Frage der Schutzimpfung der Hunde gegen die Tollwut.—*Deut. Tierärz. Woch.* 1928. Dec. 8 Vol. 36 No. 49 pp 817-823 With 1 text fig [39 refs.]

⁴⁴ MARGINESU (P) Ricerche sul potere lissidica ed immunizzante del siero di cani vaccinati col metodo giapponese Umeno e Doi.—*Giorn. di Chir. Med.* 1929 Feb 10 Vol. 10 No. 2 pp 67-82. [Hyg Inst. Univ. Padua.]

⁴⁵ MARKOWSKI (Sigismund) & LEGEZYNSKI (Stanislaw) Recherches expérimentales sur la vaccination antirabique curative des chiens.—*C. R. Soc. Biol.* 1929 Feb 1 Vol. 100 No. 4 pp 289-290 [1 ref.]

⁴⁶ REMLINGER (P) & BAILLY (J) La vaccination antirabique du chien au Maroc.—*Bull. Acad. Méd.* 1929 Mar 12. Year 93 3rd Ser. Vol. 101 No 10 pp 368-374 [8 refs.]

⁴⁷ REMLINGER (P) & BAILLY (J) La vaccination antirabique du chien au Maroc.—*Rec. Gén. de Méd. Vet.* 1929 Apr 15 Vol. 38 No 448. pp 193-200 [8 refs.]

Bulletin Vol. 22, p. 704) Of 234 dogs treated prophylactically and 30 which had been bitten in natural circumstances by rabid dogs 2 of the former group and none of the latter developed rabies. The ether vaccine in their opinion owes its power not only to the living virus contained in it but to the quantity which can be employed (120 cc.). It will be remembered that the treatment consists of three doses, the first of fixed virus which has been operated on by ether for 25 hours the second for 20 hours and the third for 15 hours, the dose in each case being the equivalent of one brain. VALLEE⁴⁸ in a report on this communication strongly recommends the method.

USTURV⁴⁹ using doses of 0.3 to 1 gm. of fixed virus at first in normal salt solution, and later in glycerine has treated 223 dogs during the period 1920-1927. Only one of these developed rabies. He believes that the vaccine so prepared is more active than carbonized vaccines or lysin. From a limited experiment he concludes that doses of more than 1 gm. are dangerous.

IX. *Visceralis* PONOMAREW⁵⁰ recommends sub-occipital puncture in the experimental transmission of rabies. The animal is anaesthetized, and the skin suitably prepared. The tip of the index finger of the right hand then is placed on the space between the occipital bone and the atlas and guides the point of the syringe into the interval. A small quantity of cerebro-spinal fluid is withdrawn, and the barrel of the syringe is detached. Thereafter a dose of 1 cc. may be easily injected into the rabbit and a dose up to 10 cc. into the dog. He recommends the method especially in experiments where accuracy of dosage is of importance. It has been successfully used on 300 rabbits.

SCHERN⁵¹ describes a simple instrument for trephining rabbits. It consists of a flat strip of metal through the end of which, and perpendicular to the flat surface a part like a large drawing pin is screwed. The strip is continued into a handle which is grasped in the fingers, the thumb pressing on the head of the drawing pin. The skull is perforated by pressing the thumb the depth of the perforation depends upon the adjustment of the screwed pin.

PRISALIX and PASTEUR⁵² bring forward further experiments which show that exposure to ultra-violet rays kills the rabies virus.

MOOSER⁵³ finds that of 34 rats immune to recurrent fever the *Spirochaeta duttoni* can be demonstrated in the blood three months after

⁴⁸ VALLEE et al. Sur la vaccination antirabique selon la méthode de Ranbyer — *Bull Acad Med* 1929 May 14 93rd Year 3rd Ser Vol 101 No 13 pp 604-606

⁴⁹ LARUEY (D.) Ueber Immunisierung der Hunde und anderer Tiere gegen die Tollwut — *Arch f. Bakt I Abt Orig* 1929 Jan. 11 Vol. 110 No 47 pp 175-180 [9 refs. (Microbiol Inst., Rostov a D.)]

⁵⁰ PONOMAREW (A. W.) La piqûre sous-occipitale comme méthode d'infection rabique par l'aspect sous-arachnoïdien — *Arch Sci Biol* 1929 Vol. 28 No 1 pp 75-81. With 4 text figs [10 refs.] (In Russian. French summary pp 82-84.)

⁵¹ SCHERN (K.) Ein einfaches Instrument als Trepanersatz zur subduralen Infektion von Kaninchen, speziell mit Tollwutvirus. — *Dtsch Tierärztl Woch* 1929 Apr 13 Vol 37 No 15 pp. 233-236. With text figs

⁵² PRISALIX & PASTEUR (F.) Action des rayons ultra-violet sur le virus rabique et ses antigènes rabique et canin — *C R Acad Sci* 1929 Jan. 14 Vol 188 No 3 pp 276-278 [1 ref.]

⁵³ MOOSER (Hermann) Ueber den Einfluss der Wundinfektion auf die Gehirnsprochäetose Rekurrens immuner Ratten. — *Arch f. Schiff- u. Trop Hyg* 1929 Feb Vol 33 No 2 pp 83-92. [11 refs.]

infection in all cases. Whilst of 27 rats similarly immune but also artificially infected with rabies the spirochaete was observed in only 56 per cent. This disappearance of the spirochaete is explained as due to increased permeability of the vascular endothelium in brains which have been changed by encephalitis.

PHISALIX⁵⁴ believes that all sera which are naturally antirabic, are also antivenomous. The converse is however not always the case. Natural antivenomous sera are not all antirabic.

LAUGHINGHOUSE⁵⁵ discusses the possibility of eradicating rabies from the Southern States of America. He favours the adoption of muzzling and destruction of ownerless dogs rather than prophylactic vaccination

A. G. Mckendrick.

⁵⁴ PHISALIX. Sur quelques propriétés comparées des sérums antirabiques d'animaux vaccinés et celles des sérums antirabiques naturels.—*C R Acad Sci* 1929 Apr 22. Vol 188 No 17 pp 1126-1128.

⁵⁵ LAUGHINGHOUSE (Charles O'H.) The Prevention of Rabies by Legislative Enactment.—*Southern Med J* 1929 May Vol 22 No 5 pp 503-504

KALA AZAR.

NICOLLE (Charles) & ANDERSON (Charles) *Chronique du kala azar en Tunisie. [Reports of Kala Azar in Tunisia.]—Arch. Inst. Pasteur de Tunis.* 1929 Mar Vol. 18. No. 1 pp. 63-70. [1 ref.]

Up to the year 1925 there had been observed in Tunisia, 67 cases of kala azar (this *Bulletin* Vol. 22, p. 687). In addition, six further cases have been recorded while twelve are now noted for the first time. In all, 85 cases, all diagnosed by spleen puncture have been seen. Of the 85 cases the parents of 58 were Italian, those of 11 French, those of 4 French and Italian, and those of 4 others Maltese. The parents of one were French and Maltese. Four of the cases were in native Mohammedans and 3 in native Jews. The frequency amongst the Italians is very remarkable but no explanation of this is given. As regards age incidence the following figures are given: 5 to 6 months 2, 6 months to 1 year 10, 1 to 2 years 29, 2 to 3 years 15, 3 to 4 years, 8, 4 to 5 years 5, 5 to 6 years 7, 6 to 7 years 4, 8 to 10 years, 2, 71, 25 and 38 years 3.

Referring to cultures the authors state that they have several strains which they will be glad to supply to investigators who require them. They are: (1) Human kala azar five strains isolated in September 1910, February 1912, August 1918, December 1926 and April 1927. Up to December 1928 these have been subcultured 499, 449, 267, 53 and 43 times respectively. (2) Canine kala azar two strains isolated in December 1911 and February 1913 and subcultured 449 and 433 times respectively. (3) Oriental sore four strains isolated in 1909, November 1919, December 1919 and April 1926, and subcultured 488, 236, 234 and 70 times. The second strain is actually the same as the first which was inoculated into man and reisolated in November 1919. (4) *Leptomonas* of the gecko. Two strains isolated by CHARTON at Dehbat in April and May 1917 and subcultured 302 times, and two strains isolated at Tamerza in October 1919 and subcultured 238 times.
C. M. Wenyon.

JEXXA (R.) *Sulla endemia di leishmaniosi infantile in Italia. [Endemicity of Infantile Leishmaniasis in Italy.]—Pediatrics.* 1929 Feb 1 Vol. 37 No. 3 pp. 113-118. [Pediat. Clin. Univ. Naples.]

The paper is one which was presented at the Congress of Tropical Medicine and Hygiene held in Cairo in 1928, and deals with the endemicity of kala azar in Italy. It is most prevalent in the Provinces of Naples and Catania. Up to 1914 110 cases were seen at the Clinica Pediatrica at Palermo while the author was director and 119 cases since then by his successor DI CRISTINA. At Catania 1400 cases have been seen by LOXGO, 180 cases by CANVATA at Messina, 20 by MAGGIORÉ and MALLARDI at Bari, and 30 others by various other observers. Of the total of about 2,400 cases about two-thirds have been seen during the last ten years. Up to 1925 in the Province of Naples, the cases seen annually increased up to a maximum of 73. During the last three years there has been a decline to an average of 50. The improvements in hygiene and the standard of living under the Fascist régime may have lessened the morbidity rate for the number of patients seen at the clinics has certainly decreased. The outstanding feature of the disease is the great change which has taken place since the introduction of

treatment with tartar emetic. A recovery rate of 10 per cent. in the pre-tartar emetic days has been converted into one of 90 per cent. Statistics of 551 observations give a general cure rate of 78 per cent. In 1928 this had increased to 90 per cent. In the author's experience the organic antimony compounds such as urea stibamine and stibosan though well tolerated and administrable by intramuscular injection are no more curative than tartar emetic.

C. M. W

YOUNG (Charles W) & HERTIG (Marshall) *The Kala Azar Transmission Problem Field and Laboratory Studies in China. I. Epidemiology*—*Amer Jl Hyg* 1929 Jan Vol 9 No 1 pp. 227-246. With 2 text figs. [29 refs.] [Peking Union Med. College Peking.]

This paper is the first of a series in which it is proposed to describe the work done in China, during the four years 1924 to 1927 on the kala azar transmission problem. It deals especially with general considerations regarding the epidemiology of the disease.

The endemic area in North China is substantially that noted by COCHRAN in 1912. It occupies roughly the whole of the coastal plain north of the Huai River from the hills of Shansi to the coast and bounded on the north by the Great Wall. The most heavily infected area is roughly a belt in the region of the old course of the Yellow River from the Province of Honan to the sea, with the heaviest centre near the Grand Canal. The disease is not known to occur in Korea or Japan. The early history of the disease in China is unknown. There has been no great epidemic like that in Assam. The disease tends to occur in cycles of fifteen to twenty years but the incidence in each area or village may have no relationship to that in neighbouring ones. The cycle is characterized by a mild epidemic lasting four or five years followed by a decline to few or no cases for ten or fifteen years. The incidence is characteristically sporadic, successive cases in a village showing no obvious relationship to previous ones. Furthermore there is no evidence of any seasonal variation in the incidence of cases as first pointed out by PATTON and HINDLE. This may be of significance when taken into consideration with the definite sand fly season of the end of May to the end of September. Mention is made of a case noted by HINDLE in which an infant four months old was admitted to hospital in Tientsin with the disease in March. In such a case however the possibility of infection from the mother has to be taken into account.

The incidence of kala azar is definitely rural and no large city is known to have much of the disease. The infected areas as in India, are chiefly flat plains of deep alluvial soil, while most of the rural regions in the endemic area are subject to floods during the rainy season of June and July. At other times of the year where there is little rainfall, the land may be dry and approaching semi aridity. In other parts with a rainfall of about 25 inches the country is less dry. Wheat is raised everywhere and forms the chief article of diet. Neither rice nor bamboo are grown and it is noteworthy that these are replaced abruptly by wheat fields at the Huai River the southern limit of the disease. Examining the various conditions the authors have been unable to determine any single factor characteristically associated with kala azar in China, nor have they been able to distinguish any feature characteristic of infected villages or houses.

On the subject of transmission the various theories which have been advanced are reviewed. Reference is made to the discovery of the susceptibility to inoculation of the hamster. Attempts to discover a reservoir of infection in the hamster or other animal failed. Attention was paid especially to the sand fly, but the problem is still unsolved. The fact elucidated that leishmania injected into the coelom of sand flies will flagellate and persist for nine days, while they will behave similarly and persist for at least forty days in the bed bug, raises the question as to whether such a development is any indication of the specificity of the organism for the particular arthropods. These and other features of the work will be discussed in subsequent communications.

C. M. W

HU (C. H.) & LEE (C. U.) New Technique for feeding Sandflies (*Phlebotomus*) for Experimental Transmission of Kala-Azar.—*Proc Soc Experim Biol & Med.* 1929 Jan. Vol. 26. No. 4 pp 277-280 With 2 text figs. [2 refs.] [Peking Union Med. College Peking China.]

The authors describe a method for feeding sandflies on material containing leishmania. The material consists of the plasma obtained by defibrinating and centrifuging the blood of a hamster mixed with the broken up spleen of an infected hamster. Before use the mixture is centrifuged to throw down coarse particles and sufficient red blood corpuscles added to give the concentration in blood. With the mixture, which contains large numbers of leishmania a circular piece of flannel is infiltrated and this placed on a shallow dish is covered with a piece of hamster skin from which the muscular layer on one surface and the hair on the other have been removed. The skin is stretched tightly over the flannel and tied down. This arrangement is placed on an electrically heated plate which is kept at a uniform temperature of 35° C. A small cage containing about 20 sand flies is inverted over the skin and the whole covered to exclude light. In thirty minutes 95 per cent. of the flies will have fed. Flies fed by this method never die within three or four days. If they are kept in an ice box at 21° C. and refed they will live much longer even as much as eighteen days. From July 16th to August 31st 1928 1,918 *Phlebotomus major* and 213 *P. sergenti* were fed satisfactorily in this manner.

C. M. W

HU (C. H.) HUX (Dorothy) & LEE (C. U.) Slapping as a Factor in Transmission of Kala-Azar by Sandflies (*Phlebotomus*).—*Proc Soc Experim Biol & Med.* 1929 Jan. Vol. 26. No. 4. pp 280-284 With 1 text fig. [3 refs.] [Peking Union Med. College, Peking China.]

Sandflies which have become infected as a result of ingestion of leishmania were allowed to feed on pieces of sterile flannel soaked in blood mixture. While feeding they were crushed on the flannel by a specially devised slapper worked by a spring. After the flies were crushed cultures were made from the flannel. In one instance a culture of leishmania was obtained. It is suggested that infection may occur in nature by the crushing of sand flies on the skin.

C. M. W

TIMPANO (P) Un caso di kala-azar complicato da poliomiellite anteriore acuta, con esito in guarigione spontanea [Case of Kala Azar which recovered after Acute Anterior Poliomyelitis].—*Polliclinico Sez. Prat.* 1929 May 27 Vol 36 No 21 pp 741-742

A child aged 2 years and 7 months suffered from fever and enlargement of the spleen. As it came from a malarial district it was treated with quinine. Eventually a spleen puncture revealed numerous leishmania and a diagnosis of kala azar was made. Though antimony treatment was advised this was not carried out. Later the child was attacked by acute anterior poliomyelitis. Without any treatment whatever a complete recovery was made. The author states that this is the second case of spontaneous recovery from kala azar which has come under his notice.

C. M. W

BISSET (W) A Case of Kala Azar — *Jl Roy Army Med Corps* 1929 Feb Vol. 52. No 2. pp 131-132

The case recorded is one of a British soldier admitted to hospital at Lebong (India) for tuberculosis of the tracheo-bronchial glands a diagnosis which appeared to be confirmed by X-ray examination. Extraction of two teeth was followed by extensive cancrum oris. Kala azar was suspected when a blood-count showed 40 per cent of lymphocytes and 20 per cent. of large mononuclears and a strongly positive aldehyde test. Owing to the sensitiveness of the patient it was not possible to puncture the spleen. A course of urea stibamine resulted in the arrest of the disease the patient being discharged pending change to England after having 3.15 grams of the drug. It is noteworthy that the spleen was never more than two finger breadths below the costal margin, and that there was no obvious double remission of the temperature. Though all the more important complications associated with kala azar were present under specific treatment a rapid recovery was made the patient being able to be on his feet twenty-eight days after treatment was commenced.

C. M. W

GHOSH (Nisanath) An Unusual Complication of Kala Azar — *Indian Med Gaz* 1929 Apr Vol. 64 No 4 p 205

A Mohammedan aged 24 who was undergoing treatment with urea stibamine injured his scrotum with a bamboo. The trifling scratch led to ulceration and ultimate gangrene which appeared to result from the patient's neglect of cleanliness. Though one testis became exposed the patient ultimately recovered completely.

C. M. W

NAPIER (L. Everard) The Pentavalent Compounds of Antimony in the Treatment of Kala-Azar Part IV Urea-Stibamine an Analysis of the Treatment in 70 Consecutive Cases. Part V Stibamine Glucoside (Neostam) an Analysis of the Treatment in 57 Consecutive Cases.—*Indian Jl Med Res* 1929 Apr Vol. 16. No. 4 pp. 801-910 [6 refs.] 911-919 [5 refs.]

In Part 4 of this paper the author describes the treatment of 70 unselected cases of kala azar with urea stibamine. It is noted that this substance is of relatively low toxicity though not as low as some other pentavalent compounds of antimony. Different batches have different percentages of antimony the range being 20 to 44 per cent. In the treatment described three brands of urea stibamine were employed and no batch contained less than 30 per cent. of antimony. Of the 70 cases 64 were discharged as cured 4 died during treatment and

2 which had resisted previous treatments failed to respond and died subsequently. Injections were made intravenously, three times a week till in most cases 10 or 11 doses had been given. In every instance a liver or spleen puncture with culture was carried out before the patient left hospital and 10 days after the last injection. Of the 64 patients discharged as cured accurate information was available for 51. Of these one died after a surgical operation, one relapsed and 49 remained in perfect health for 6 months or more and were thus, according to the author's standard, cured. Of those cured 4 had relapsed after a previous treatment while 45 were treated for the first time. The mean total dose of the drug given to the 49 cured cases was 2.28 gm. Of the 4 cases which had resisted previous treatment the mean dose was 3.23 gm. The mean dose of the 45 cured cases which had received no previous treatment calculated for a 100 lb. bodyweight was 3.0 gm. and for the 4 previously treated cases 4.54. In an Appendix an analysis of 89 cases treated by Dr. FOSTER with the same drug is given. Of these 81 were cured, 4 died, 2 relapsed and 2 gave no history.

The conclusion is that urea stibamine is a drug of very considerable value in the treatment of kala azar.

Part 5 relates to a series of 57 unselected cases of kala azar treated with stibamine glucoside (Neostam). Of these 53 were discharged as cured, 2 were resistant and 2 died during the course. The two resistant cases had already proved resistant to other drugs. The two patients who died were both very debilitated when admitted. Of the 53 cases discharged as cured the subsequent history of 44 is known. Of these 9 relapsed and 35 remained in good health. The mean total dose of the drug given to the 35 cured cases was 2.14 gm. or calculated per 100 lb. of body weight, 3.17 gm. The dose per 100 lb. of body-weight according to age was under 10 4.13 gm. 10 to 20 3.25 gm. over 20 2.48 gm. Thus there was a tendency to give the younger patients a relatively larger dose and it is noted that the relapse rate was lowest among them. The drug was administered intravenously in the first few cases in a 4 per cent. solution and in the others in a 5 per cent. solution. About two-thirds of the previously untreated cases received in all ten injections. The initial dose was usually 0.1 gm. and the maximum 0.3 gm. It is concluded that stibamine glucoside is a drug of considerable value in the treatment of kala azar.

C. M. W.

LLOYD (R. B.) NAPIER (L. Everard) & PAUL (S. N.) The Serological Control of Treatment of Kala-Azar with Observations on the Significance of Hypoproteinaemia.—*Indian J. Med. Res.* 1928, Apr. Vol. 16, No. 4 pp 1063-1098. With 21 graphs (4 refs.)

In a previous paper (*ante* p. 319) reference was made to the protein graph in kala azar and it was suggested that it might be used as a serological control of the progress of treatment as the Wassermann reaction is used in syphilis. In the present paper 21 graphs are reproduced and discussed and the authors feel justified in making certain generalizations. The graphs strongly support the view that the changes they indicate may be used as a control of treatment as previously suggested. It has been proved that the serum proteins reach their normal proportions in approximately 120 days from the commencement

of treatment, no matter what may have been the kind or amount of antimony treatment given. When this stage has been reached the case is said to be in a condition of serological cure. The typical graph (*loc. cit* p 320) shows that there are two stages. In the first there is a rapid rise in the amount of albumin and a fall in that of the globulin so that the albumin and globulin lines cross one another. At the same time examination of the globulin for its two constituents euglobulin and pseudoglobulin reveals the fact that there is a steady fall of the former while the latter forming at first more than half the total globulin, falls below the euglobulin and then rises above it so that its line crosses that of the euglobulin twice. When these changes have occurred the second stage commences when it will be found that the albumin and total globulin quickly reach the normal level while the pseudoglobulin continues steadily to increase and the euglobulin to decrease till at about the 120th day they are present in normal proportions and serological cure is reached. The authors are of opinion that the speed of onset of the second stage may be regarded as an index of the potency of the treatment employed. It is much more rapid when concentrated courses of 693 B are employed than under any other mode of treatment (*loc. cit* p 321). It is noteworthy that when serological cure has been reached the formol leucogel reaction has become negative.

The impression has been gained by one of the authors (L. E. N) that cases of moderate duration in which there is high total globulin and euglobulin and a strongly positive formol-leucogel reaction respond better to treatment than those of short history. It would seem, therefore, that the protein changes so characteristic of well-established cases may be of the nature of an immunity response which assists them towards a cure when treatment is commenced. It has been noted that parasites may still be present after a course of treatment but that their presence is no indication that relapse would necessarily occur. It has been found that immediately after the concentrated eight-day course of 693 B which produces a very high percentage cure rate, parasites are almost always present but that if examination of the spleen for parasites is delayed the longer the interval the smaller are the chances of finding parasites.

The suggestion is put forward that the predisposing cause of infection with the parasite of kala azar is in some way connected with the reduction of the albumin content of the serum. In malaria the albumin is greatly reduced and the globulin slightly reduced. Under quinine treatment both curves rapidly rise to normal. If kala azar supervenes on a malarial infection the globulin curve rises above normal and the malarial parasites disappear from the blood. It is very seldom that malarial parasites are found in the blood in kala azar but when antimony treatment has taken effect typical malarial attacks are common. It would seem that both parasites exist when there is a low total protein content of the serum and that the low albumin is maintained by both parasites but that the increase of globulin in kala azar is unfavourable to the malarial parasite. Typhoid, like malaria, is associated with low protein content and these diseases may be predisposing causes of invasion of the body by the parasites of kala azar.

In secondary syphilis treated with organic arsenicals graphs similar to those of kala azar are obtained and an explanation of the beneficial effect of malaria on metasymphylis may be found in an antagonism between the low albumin type of serum in malaria and the high globulin type of cerebro-spinal fluid in metasymphylis.

The method by which the graphs may be applied to the treatment of cases of kala azar their variation in resistant cases of the disease and many other details are fully discussed in the paper. It is not possible to deal adequately with these in a summary and those who are interested will be well advised to read the original paper which is full of information and interesting suggestions.

C. M. W.

CHOPRA (R. N.) & CHOUDHURY (S. G.) On the Causation of Fomol-Gel Reaction in Kala-Azar. Part I.—*Indian J. Med. Res.* 1929. Apr. Vol. 16. No. 4. pp. 925-938. With 1 graph in text. [11 refs.] Calcutta School of Trop. Med. & Hyg. Calcutta.]

The results of the investigations described show that for any particular kala azar serum there is a definite pH at which the time required for gelation and complete opacity after the addition of formalin is a minimum. If the pH is altered towards the alkaline side it is found that the rate of decrease of opacity is much greater than that of the gelation, while the reverse is the case when the alteration is towards the acid side. If the serum is diluted with an equal volume of conductivity water or physiological saline the gelation is retarded. In diluted sera gelation may occur before or after opacity has developed. These facts suggest that the two processes, gelation and development of opacity are caused by two different proteins or that formalin reacting with englobins produces a marked change in its nature.

C. M. W.

PARADISO (F.) Sulla possibilità di estendere la prova di d'Amato alla diagnosi di kala-azar infantile. [Possible Extension of Amato's Test to the Diagnosis of Kala Azar].—*Pediatrics*, 1929. June 1. Vol. 3. No. 11. pp. 596-603. [11 refs.] [Inst. Clin. Pediatrics, Univ. Milan.]

The reaction of Amato is the occurrence of leucopenia shortly after the injection of small doses of antagonistic substances, such as tuberculin in tuberculosis, antisyphilitic drugs in syphilis, homologous vaccines in enteric, etc. The author attempted to obtain this reaction in infantile kala azar by injecting intravenously small doses of tartar emetic. As a result of observations on twenty cases it was found that the naturally occurring leucopenia obscured the results and rendered the reaction of Amato unsuitable as an aid to the diagnosis of kala azar.

C. M. W.

LABERNADIE (A.) & LAFFITTE (A.). Une réserve sur la valeur de la réaction de Chopra et Gupta (kala azar). [Reservation on the Value of the Chopra and Gupta Reaction].—*Bull. Soc. Path. Exot.* 1929. Feb. 13. Vol. 22. No. 2. pp. 7-80. [3 refs.] [Colonial Hosp., Pondicherry.]

The authors draw attention to the fact that the antimony reaction of the serum for the diagnosis of kala azar may be misleading if the patient has quinine in the blood. They advise testing the urine by Tannet's reagent to exclude the presence of quinine before the test is made.

C. M. W.

KRIGELUCHIS (I) [Zur Frage der Züchtung der Leishmanien auf dem festen Nährboden] [Culture of *Leishmania* on Solid Media].—*Nachrichten d. Tropischen Medizin* Tiflis 1928. Nov. Vol. 1 No 1 [In Georgian. German summary p 114]

While cultivating leishmania on solid medium according to the technique of MAYER and RAY (this *Bulletin* Vol. 25 p 859) the author found that by using Legroux test tubes instead of Petri dishes better and purer cultures were obtained. Further the use of sublimate solution which the employment of Petri dishes involves was no longer necessary

C. M. W

BUSS (G) Untersuchungen mit *Leishmania Vakzine*. [Experiments with *Leishmania Vaccine*.]—*Arch. f. Schiffs u. Trop. Hyg* 1929 Feb Vol. 33 No 2, pp 60-83. With 3 text figs. [11 refs.] [Kaiser Wilhelm Society for the Advancement of Science Sao Paulo.]

The paper describes experiments designed to test the reaction of the skin in cases of S American leishmaniasis when a vaccine of cultural forms of the causative organism is injected. WAGENER (this *Bulletin* Vol. 22 p 202) first noted that such a skin reaction occurred in immunized rabbits while MONTENEGRO (*loc. cit.* Vol. 23 p 585) applied it to human beings suffering from the disease. The paper under review is a further contribution to the subject. The author employed an antigen consisting of cultural forms of leishmania from a medium which was the same as Noguchi's semi-solid agar except that 0.5 per cent. dextrose was added to the physiological saline used. After ten to twelve days growth at room temperature there was a culture layer at the top of the tube 3 to 6 mm. in thickness. This was removed by a pipette and the flagellates washed by centrifuging in saline solution three or four times. The final suspension was made by adding saline solution alone and heating to 60° C. for an hour on two successive days saline solution with 0.5 per cent. phenol and heating to 60° C. for an hour on one day or saline solution with 0.5 per cent. formal and keeping in the incubator at 37° C. for three days. Sterility of the antigen was tested by culture methods. After trial it was found that the best results were obtained with an antigen containing one to three million organisms per cubic centimeter and phenol as the sterilizing agent, for the formal was liable to cause pain on injection. The results obtained were similar to those recorded by MONTENEGRO. When 0.1 cc. of the antigen is injected into the skin of a patient suffering from cutaneous leishmaniasis there develops in 48 hours a definite palpable papule which can easily be detected on account of its firmness even in dark skinned individuals in whom redness of the skin cannot be seen. The papule persists for 4 to 5 days and then quickly disappears. As control was employed the diluting fluid containing some of the culture medium. This on account of the traces of agar and serum produces a small papule, which, however in 48 hours reaches its maximum development and quickly disappears. In addition to two strains of Brazilian leishmania isolated by the author two strains of *Leishmania tropica* and one of *L. donovani* were employed for preparation of antigen. Any one of these antigens gave the same reaction so that there is no specificity as regards the species. In thirty undoubted cases of cutaneous leishmaniasis a definitely positive reaction occurred, while of three doubtful cases two gave a very probable positive result and one a definitely positive one. In ten controls it was definitely negative in

eight and doubtful in two. It is evident the test will be of use in the diagnosis of obscure cases. As a curative agent the antigen did not give satisfactory results.

C. M. W.

PARROT (L.) Sur la contagion directe du bouton d'Orient. [Direct Contagion of Oriental Sore].—C. R. Soc. Biol. 1929 Feb. 22. Vol. 100 No. 7 pp. 467-468. [4 refs.] [Pasteur Inst. of Algeria, Algiers.]

Though it is generally admitted that oriental sore is transmitted by sand flies some still believe that direct infection from case to case may occur. The parasite being a motionless body is not adapted to active penetration of the skin, so that if such infections occur they must be the result of parasites being transferred to abrasions. If this happened with any frequency it would be expected that cases would occur throughout the year whereas there is a definite seasonal incidence. Furthermore the sores would occur most usually on the back of the hand and fingers where abrasions are most common. Of 248 sores observed in Algeria only 9 occurred in these situations. Furthermore, the sores are generally covered by a scab which hinders the escape of parasites and when pus exudes this is contaminated with bacteria, and leishmania cannot be found in it. Practically all the cases of oriental sore which have been recorded as resulting from direct contagion have occurred in places where sand flies are common. For these and other reasons it is evident that the contaminative method of infection in oriental sore has not been established.

C. M. W.

ADLER (S.) & THEODOR (O). Attempts to transmit *Leishmania tropica* by Blits: the Transmission of *L. tropica* by *Phlebotomus sergenti*.—Ann Trop Med. & Parasit. 1929 Apr 28. Vol. 23 No. 1 pp. 1-18. With 1 plate. [7 refs.] [Microbiol. Inst., Hebrew Univ. Jerusalem.]

The authors note that they have shown previously that *L. tropica* is a natural flagellate of *Phlebotomus papatasi* and that the flagellates from naturally infected flies and flies artificially infected from sores or cultures are infective when inoculated into the skin of man. It is pointed out that human beings not previously infected may show a natural immunity for of two inoculated nearly two years ago with parasites from a cutaneous lesion only one has developed an infection. Of nineteen volunteers inoculated with flagellates from artificially infected sand flies only six developed oriental sore. It is further noted that strains of *L. tropica* vary in their infectivity to sand flies. Thus, one from the Syrian village Bar Elias, where during the last six years almost every inhabitant has contracted the disease, is highly infective to the sand fly. On the other hand, a strain from Jericho, where the disease is comparatively rare is much less infective to the fly. Sand flies infected by feeding on cultures of *L. tropica* through a rabbit skin membrane were fed on twelve volunteers and one puppy. The number fed on each case varied from 2 to 88. A negative result was obtained in every one except volunteer No. 2, in which after a period of ten months, lesions appeared on the left arm at the site on which the flies had fed. The lesions were in the form of two small vesicles which were followed a day later by the appearance of two more. Fluid from the vesicles

contained extra-cellular parasites. The authors are reluctant to conclude that this experiment affords the final proof of sand fly transmission of oriental sore, for after the experiment the volunteer lived in a quarter of Jerusalem where there are always a number of imported cases of oriental sore. Furthermore about six months after the infected sand flies had fed on the left arm as no infection appeared to have occurred, the volunteer (as in the case of Nos. 1 6 and 8) was used for other experiments. Cultures were inoculated into two points on the lower part of the left arm while later flagellates from infected *Phlebotomus sergenti* were inoculated into three scarified points on the right arm and still later into two points in the left deltoid region. No infection had resulted from the first of these inoculations in five months nor from the third in four months but a little over three months after the second and eleven days after the appearance of the vesicles referred to above a raised spot containing parasites appeared at one of the inoculation points on the right arm. It is unfortunate that the first experiment was complicated by subsequent inoculations and the possible exposure to natural infection but it would seem that the appearance of the vesicles on the small area, about one inch square on which the sand flies had fed, leaves little room for doubt that the infection had occurred as a result of the feeding of the infected insects.

It is pointed out that *Leishmania tropica* develops in *Phlebotomus sergenti* as it does in *P. papatasi*. In both flies however only a small proportion of the sand flies acquire a proboscis infection if they have been kept at a temperature of 19° C. to 23° C. At higher temperatures (27° to 30° C.) proboscis infections in *P. papatasi* are much commoner and it is suggested that this may account for the difficulty in producing infections by the bite of infected sand flies for those fed on the volunteers were kept at the lower temperature. A description of the experiments which demonstrated that flagellates are inoculated into fluid when infected sand flies feed through a rabbit skin membrane is given. The specimens of *P. sergenti* used in the experiments were bred from eggs brought to Palestine from Bagdad in which place one naturally infected sand fly of this species was encountered. The flagellates from this fly were inoculated into volunteer No 8 but no infection had resulted in seven months.

C. M. W

ADLER (S) & THEODOR (O) Additional Evidence on the Occurrence of *L. tropica* in Wild *Phlebotomus papatasi*—*Ann Trop Med & Parasit* 1929 Apr 26. Vol. 23 No 1 pp. 19-21 [5 refs.] [Microbiol. Inst. Hebrew Univ Jerusalem.]

The authors previously recorded the fact that three human beings were infected with *Leishmania tropica* by the inoculation of flagellates taken from dissected *Phlebotomus papatasi*. SINTON criticised the diagnosis of the fly while KNOWLES implied that it was probably *P. sergenti* owing to the failure in India to infect *P. papatasi* by allowing it to feed on an oriental sore. It is admitted that there might be a fallacy in the diagnosis of the female sand fly for the value of the characters of the pharynx was discovered later. Nevertheless the authors note that though LAROUSSE recorded *P. sergenti* in Palestine in 1924 they themselves in four and a half years collecting and breeding, during which many thousands of sand flies have been examined have not encountered a single specimen of *P. sergenti*. It

is now reported that when the three original naturally infected sand flies were dissected, the head of one was mounted and kept. A re-examination of this head reveals the fact that its pharyngeal characters are typical of *P. papatasi*.

C. M. W.

D'UTRA (O.) & SILVA. Quelques caractères des leishmanioses tégumentaires brésiliennes. [Characters of Dermal Leishmaniasis in Brazil.—*Bull. Soc. Path. Exot.* 1929. Dec. 12. Vol. 21. No. 10. p. 848.]

On the occasion of the regrettable death of Gaspar VIARZA the author pays a tribute to this investigator in pointing out that the tartar emetic treatment for Brazilian leishmaniasis, first advocated by him, is the one which should be employed for this disease which is not a local infection capable of being dealt with by local measures. It is a general infection parasites occurring far from the original focus, and on this account demands a general treatment.

C. M. W.

ESCOVEL (E.) La leishmaniose américaine et les leishmanioses en Amérique. [American Leishmaniasis and Leishmaniasis in America.—*Bull. Soc. Path. Exot.* 1929. Jan. 9. Vol. 21. No. 1. pp. 35-46. With 12 figs. on 8 plates. [1 ref.]

The author maintains that there are two distinct types of mucocutaneous leishmaniasis in America and that both of them are distinct from oriental sore. American leishmaniasis occurs in Mexico, Central America, and South America, in Colombia, Venezuela, the Guianas, Ecuador, Peru, Brazil, Bolivia, Paraguay, Northern Argentina and Uruguay. It was thought at one time that many of the vases (busts) made by the Incas which depicted mutilated faces of human beings were based on the deformities produced by the disease. The archaeologist VÍCTOR LARCO HERRERA has, however, discovered a ceramic illustrating an individual in the act of removing the lips of another person with a cutting instrument (tumija). It seems clear that the pre-Columbian artists in their vases were illustrating the effects of this operation rather than the ravages of disease. The author however states that the Incas knew of the disease for Dr. RIBEIRO has shown him a vase on which the face shows the typical nasal deformities produced by leishmanial ulceration. The author passes on to a discussion of the differences which exist between oriental sore and American leishmaniasis. The chief of these are the benign character and rapid healing of the former followed by immunity and the tendency to involvement of the mucosae the long duration and lack of immunity in the latter. As regards the American disease two distinct types exist. In the one Uta, the infection is essentially one of the skin, the mucosae becoming involved by direct extension of the ulcerative process. In the other Espundia, there is a primary skin lesion, but the mucosae become secondarily infected as in syphilis. True oriental sore may be met with in S. America in immigrants from endemic centres of this disease. The S. American disease shows various clinical types. Of the cutaneous forms there are the ulcerative papulo-tuberculous, crusted, lymphangitic and circinate varieties and of the mucosal forms there are those due to the extension of the cutaneous ulcer of Uta and the secondary ulcerations of Espundia.

The lesions due to leishmania infection are readily confused with others due to blastomycosis—caused by *Cryptococcus americanus*. In many cases the differentiation can be made only in the laboratory. When the two infections co-exist in the same individual the diagnosis is very difficult. Frequently the response to antimony treatment may be the only indication that the disease is leishmaniasis and not blastomycosis. As regards treatment it is necessary to commence this as early as possible and while giving intravenous injections to destroy all suspicious lesions. Local cauterization intravenous tartar emetic and iodine bismuthate of quinine are the best known remedies. Radium X rays, diathermy and ultra violet rays are being used experimentally at the present time.

C. M. W

DRY (Nepal Chandra) **A Case of Post-Kala Azar Dermal Leishmaniasis.**—*Indian Med Gaz* 1929 Mar Vol. 64 No 3 pp 147-148

A Hindu boy aged twelve four months after having been discharged as cured from kala azar noted small depigmented spots on the lips chin arms legs and body. These increased in size and on the lips back of wrists dorsum of feet anterior aspect of the knee and inner aspect of the elbow were replaced by nodules. Smears made from the cut surface of a nodule revealed leishmania. The spleen was not palpable and the aldehyde test negative. The urea stibamine or antimony test was positive. A course of urea stibamine was commenced and a complete cure resulted after 2-4 grams had been administered. This condition though fairly common in Calcutta, is rare in Assam where the disease was contracted. The author notes that during four and a half years experience of kala azar in the most heavily infected areas of Nowgong he has seen no other case of the kind.

C. M. W

ARTAMONOW (A. S.) [Ein Fall von Hautleishmaniose nach einer ueberstandenen inneren Leishmaniose] [**Dermal Leishmaniasis following Visceral Leishmaniasis.**]—*Russian Jl Trop Med* 1929 Vol. 7 No 1 pp 1-3 With 2 figs on 1 plate [3 refs.] [In Russian. German summary p 3]

A child seven years of age contracted kala azar in Kokand in Turkestan. Treatment was commenced in March and complete cure was considered to have taken place by May. In July a sore appeared on the leg and this was diagnosed as oriental sore. There was no recurrence of the kala azar and treatment of the sore effected a cure by October. It is concluded that kala azar does not confer immunity against oriental sore. However the possibility of a simultaneous or nearly simultaneous infection with both diseases is not ruled out. The author mentions another case in which after recovery from oriental sore kala azar was contracted.

C. M. W

DOUGAS (Chr) Cent deux boutons d'Orient sur un même malade [**Hundred and Two Oriental Sores in One Patient.**]—*Bull Soc Française Dermal et Syph* 1929 May No 5 pp 469-475 With 2 text figs

A youth 18 years of age an inhabitant of Crète presented himself at Athens for multiple skin lesions which had been diagnosed as of syphilitic origin and had failed to respond to antisyphilitic treatment. The disease commenced as a small papule on the right cheek. Later other similar papules appeared on various parts of the head and finally on the back of the hands and forearms. In six months there were present in all 102 lesions varying in size from that of a lentil to a two franc piece. A diagnosis of

oriental sore was made by discovery of the parasite in many of the lesions and a complete cure was effected in four and a half months by the injection into the base of all the lesions of solution of emetine hydrochloride.

C. M. W.

VIGNE (P.) & BOURRIET (M.) Bouton d'Orient de la face. [Oriental Sore of the Face].—*Marseille Med.* 1929 Feb. 25. Vol. 68. No. 6. pp. 310-311.

The patient aged 45 was born in Cesarea in Turkey and lived there all her life till she came to Marseilles where she has been for four and a half years. Six months ago a small papule appeared on the nose and this developed into a typical oriental sore. It was not possible to trace any source of infection in Marseilles yet the otherwise excessively long incubation period seems to indicate that the disease must have been contracted there. The author recalls that a year ago he had a similar case in a child which had lived in Marseilles two and a half years.

C. M. W.

GUPTA (B. M. Das) & DIXHIT (B. B.) Berberine in the Treatment of Oriental Sore.—*Indian Med. Gaz.* 1929 Feb. Vol. 64. No. 2. pp. 67-70. [4 refs.] [School of Trop. Med. & Hyg., Calcutta.]

Berberine sulphate promises to be a specific cure for oriental sore, for given by infiltrating the tissues around the edge of the sore it brings about complete cure in two to three weeks. Treatment is carried out by injecting 1 to 2 cc. of a 1 per cent. solution of the sulphate or 1 cc. of a 2 per cent. solution of the acid sulphate the exact quantity depending on the size of the sore. The quantity used on each sore is not injected at once, but at four or more points round the sore. The injections are repeated in a week and again if necessary. The solutions are very stable and can be preserved in sterile tubes with rubber caps, desired amounts being withdrawn by the syringe when required. Tested on cultures of *Leishmania tropica* it was found that in dilutions of 1 in 80 000 inhibition of growth occurred.

C. M. W.

HAMILTON BROWNE (E.). Oriental Sore.—*Jl. Assoc. Med. Women in India.* 1929 Feb. Vol. 17. No. 1. pp. 8-11.
DEVI (Lakshmi) Oriental Sore Treatment.—*Ibid.* pp. 11-16.

The paper refers to the frequency of oriental sore in Lahore and advocates treatment by the berberine sulphate method of VARMA and CHANDANI which leads the author to write "we have had great success in its use." The treatment is carried out as follows. A quarter of a grain of berberine sulphate is dissolved in 1.5 cc. of distilled water and sterilized. The solution is injected round the sore. The needle is inserted subcutaneously half an inch from the margin of the sore and passed forward till it reaches the margin of the ulcer when 0.5 cc. is injected. The procedure is repeated at two other points. If the sore is not healed in a week the treatment is repeated. Rarely is a third treatment necessary.

C. M. W.

DEVI (A. Lakshmi) **Berberine Sulphate in Oriental Sore**—*Indian Med Gaz.* 1929 Mar Vol. 64 No. 3. pp. 139-140

Details of the treatment of twelve cases of oriental sore in Lahore by local injections of berberine sulphate are given in the paper. Of the 18 sores in the 12 cases 6 healed completely with one injection 5 with two five with three and 1 in which the original diagnosis was doubtful did not show any improvement. One case did not return after the first injection. In the treatment the margin of the sore is infiltrated with a 2 per cent. solution of the drug. In most of the cases 15 cc. was injected at each treatment.

C. M. W

FUCHS (David) A proposito de um caso de leishmaniose tegumentar [**A Case of Dermal Leishmaniasis.**—*Brasil Medico* 1929 Jan. 12 Vol. 49 No. 2. pp. 46-51 With 3 text figs.

A typical case of mucocutaneous leishmaniasis which was cured by intramuscular injections of antimosan and local applications of a paste containing stibosan, leads the author to write a general review of our knowledge of this disease.

C. M. W

MAYER (Martin) Tierversuche mit *Leishmania tropica* (Orientbeule) [**Animal Experiments with *L. tropica*.**—*Dermat Woch.* 1929 Feb. 23. Vol. 88. No. 8. pp. 286-288. With 3 text figs [Inst. for Ship & Trop. Diseases Hamburg]

The author notes that he has already shown that the European hamster *Cricetus frumentarius* is as susceptible as the Chinese species *Cricetus griseus* to infection with *Leishmania donovani*. The observations of CASH and HU that Chinese hamsters infected with this parasite frequently showed massive infection of the reticulo-endothelial system of the skin, led the author to examine his infected European hamsters. In them he found the skin heavily infected. Usually there was no visible change in the skin, but sometimes there were small excoriations on the abdomen and these revealed parasites in large numbers.

European hamsters were inoculated intraperitoneally with cultures of *Leishmania tropica* with a view to finding out if in them a generalized infection like that produced by *L. donovani* would occur. Strains from Palestine, Turkestan and S. America were used. Only on one occasion was a generalized infection produced. Kala azar hamsters were inoculated in the skin of the abdomen with cultures of the organisms of kala azar and oriental sore. In both cases after two or three weeks a black discoloration of the skin having the appearance of haemorrhage at the site of inoculation was observed. On section it was seen that the dark colour was not due to parasites which were deep in the tissue, but to the new formation of hair follicles which were closely packed together in the reduced fat tissue. Inoculation into the skin of the nose, ears and tail, produced local infections. On the ear and nose swellings without ulceration were produced and parasites could be recovered after many months. One of the hamsters inoculated in the skin of the ear with the Palestine strain showed swelling with crust formation. On removal of the crust fluid was obtained containing many *L. tropica*. Two other hamsters inoculated subcutaneously at

the root of the tail developed ulcers heavily infected with leishmanias. From these observations it appears evident that the hamster is not such a suitable experimental animal for oriental sore as it is for kala azar.

C. M. W.

PARROT (L.) De la virulence des cultures de *Leishmania tropica* pour la souris blanche. [Virulence of *L. tropica* Cultures for the White Mouse.]—*C. R. Soc. Biol.* 1929 Feb. 1 Vol. 100, No. 4 pp. 238-239 [2 refs.] [Pasteur Inst. Algiers.]

The author in collaboration with DONATIEN (this *Bulletin* Vol. 24, 647) showed that mice inoculated in the skin of the tail developed local lesions resembling oriental sore. The lesions persist often for a year and parasites are constantly found in them. The author emphasizes the use of this, not only for maintaining strains but for the recovery of cultures which have been lost through contamination or other cause. Mice inoculated at intervals of about a month, will yield material whenever it is required for experiment or demonstration.

C. M. W.

PARROT (L.) Sur la conservation du virus du bouton d'Orient chez la souris blanche. [Preservation of Virus of Oriental Sore in White Mice.]—*C. R. Soc. Biol.* 1929 Feb. 1 Vol. 100, No. 4 pp. 239-240. [1 ref.] [Pasteur Inst. Algiers.]

The author having isolated seven strains of *Leishmania tropica* from cases of oriental sore, found that at first they regularly infected mice whether injected intraperitoneally or into the testis or skin of the tail. The last method of inoculation produced a local lesion, resembling oriental sore in man, but the others gave rise to generalized infections, as manifested by cutaneous localizations of the parasites, ulceration of the ears, tail and scrotum, adenitis and periarthritis, and hypertrophy of the spleen. Three of these cultures were maintained by subculture, during which the virulence has appreciably diminished. After periods of subculture of two months to a year two of the strains failed entirely to infect mice. The other strain maintained for 24 months, failed to infect by the intraperitoneal method, though at ten months it infected intratesticularly. These observations indicated that in judging of the virulence of strains of leishmania, the length of time of subculture has to be taken into account. A virus which has been kept by subculture and fails to infect mice is not necessarily different from one which is still infective.

C. M. W.

PARROT (L.) Sur la vaccination contre le bouton d'Orient. [Vaccination against Oriental Sore.]—*C. R. Soc. Biol.* 1929, Feb. 15, Vol. 100 No. 6 pp. 411-412. [2 refs.] [Pasteur Inst. Algiers.]

Attempts were made to vaccinate monkeys (*Macacus murex*) against oriental sore by use of a vaccine prepared from *Leishmania tropica* obtained from the testicular infection in mice. Neither this procedure nor the injection of living parasites from mice or avirulent cultures produced any immunity.

C. M. W.

DONATIEN (A.) & LESTOQUARD (F.) La leishmaniose viscérale du chien. [*Canine Kala Azar*].—*Rev. Vét. et J. de Méd. Vét.* 1929 Mar Vol. 81 pp. 117-135 With 2 text figs. [8 refs.] [Pasteur Inst. Algiers.]

This is a general account of canine kala azar and is chiefly a summary of work published on the subject. For dogs suffering from the disease intravenous injections of tartar emetic are advised, commencing with a dose of 1 centigram in 1 per cent. solution and increasing to a maximum of 5 centigrams. Injections are given on alternate days till four injections have been made. After a week's rest the course of four doses is repeated. In some cases two courses will effect a cure in others more are required.

C. M. W

DONATIEN (A.) LESTOQUARD (F.) & PARROT (L.) Parasitisme anormal dans un cas de leishmaniose du chien. [*Abnormal Parasite Distribution in a Case of Canine Leishmaniasis*].—*Bull. Soc. Path. Exot.* 1929 Apr 10 Vol. 22. No. 4 pp. 252-253. [Pasteur Inst. Algiers.]

A dog showing all the symptoms of canine kala azar was brought from the pound to the Pasteur Institute in Algiers. It was noted that there were scabbed ulcers on the ears legs and abdomen, unilateral keratitis and patches on the body from which the fur had disappeared. The serum solidified with formol (20 grams of serum + 2 grams of formol) in 22 minutes. Leishmania were found in the ulcers on the legs ears and abdomen. Splenectomy was performed and contrary to expectations the organ was small and contained few parasites. The dog died a few days later. Parasites were scanty in the bone marrow very scanty in the glands but more numerous in the liver. This dog was anomalous therefore in having more parasites in the skin than in the internal organs. The authors remark that this condition has not been observed previously but there is evidently some resemblance to that described by CHODUKIN and SCHEWTSCHENKO in Tashkent (*ante* p. 323).

C. M. W

SOFFIEWE (M. S.) & SCHÉWITSCHÉNKO (Ph. J.) [La vitalité de la *L. canis* dans l'appareil digestif du *Phlebotomus papatasi* (Scoop)] [*Survival of L. canis in P. papatasi*].—*Pensée Méd. d'Usbekistane*. Tashkent 1929 No. 5 pp. 48-55 With 37 figs. [In Russian. French summary p. 100.]

The paper describes experiments with *Phlebotomus papatasi* and cutaneous leishmaniasis of dogs in Tashkent. They were carried out as described by KHODUKIN (*ante* p. 324) and like this observer the authors obtained infection of the flies. Wild sand flies were chiefly employed and after feeding on the sores they were kept at a temperature of 21 to 28° C. and dissected after one to eight days. After one day 25 flies gave a percentage of 96 infected with flagellates after two days 26 gave 69.2 per cent. after three days 26 gave 61.5 per cent. after four

days 59 gave 20.4 per cent. after five days 52 gave 11.5 per cent., after six days 37 gave 2.7 per cent. after seven days 25 gave 4 per cent., while after eight days 74 gave 4.05 per cent. Thus the percentage of infections in the flies decreased rapidly after the third or fourth day. The flies employed were collected in a locality where no naturally infected flies were found. In a batch of twenty five flies collected in another locality two were found naturally infected.

C. M. W.

ADLER (S) & THEODOR (O). Observations on *Leishmania ceramodactyli* n. sp.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929 Jan. 30 Vol. 22 No. 4 pp. 343-356 With 16 figs. [11 refs.] [Microbiol. Inst. Hebrew Univ. Jerusalem.]

Interest in *Leishmania tarantolae* was first aroused by the suggestion of SERGENT, LEMAIRE and SENEVET in 1914 that this flagellate was possibly *Leishmania tropica* and that the gecko *Tarentola mauritanica*, might act as a reservoir for the virus of oriental sore. NICOLLE, BLANC and LANGEROUX in 1920 compared cultures of the two organisms and concluded that they were different because they differed in size while *L. tarantolae* did not produce oriental sore when injected into man and monkeys. YOUNG and HERTIG (1928) reported they had produced with *L. tarantolae* infections in hamsters similar to that caused by *L. mazzotti*, and the reviewer suggested that on this account the gecko might be the reservoir of the virus of Mediterranean kala azar. SHORTT and SWAMINATH (1928) isolated a similar parasite from the gecko, *Hemidactylus* sp. in India, and actually observed leishmania forms in leucocytes in the peripheral blood. While in Bagdad, the writer of the paper under review investigated by heart blood culture the following geckos, *Ceramodactylus dorae*, *Gymnodactylus scaber*, *Altiphryx tuberculata* and *Hemidactylus persicus*. The first named species alone gave cultures of leishmania which were studied in culture and in sand flies. The flagellates differed from cultural forms of various leishmania, including two strains of *L. tarantolae* by the presence of certain long forms with the body up to 35 μ in length. By feeding sand flies, *Phlebotomus papatasi*, on an infected gecko or on cultures it was found that development took place with a tendency for the flagellates to take up a position in the hind gut and attach themselves there and not in the stomach and cardia, as occurs with the leishmania which produce disease in man and *L. tarantolae*. Infected sand flies pass flagellates in various stages of development in their faeces. It is concluded that *P. papatasi* is probably the vector of the flagellate and that infection of the gecko takes place by oral contamination. Immune sera, prepared in rabbits from this flagellate and the two strains of *L. tarantolae*, showed that in culture media made with the sera, *L. tarantolae* was agglutinated by its homologous serum, but not with that of the flagellate of *Ceramodactylus* and vice versa. For the various reasons given above it is concluded that the flagellate of *Ceramodactylus* represents a new species which is named *Leishmania ceramodactyli* and that it occupies an intermediate position between the purely insect leptomorphs and the other species of *Leishmania* of which the sand fly development is known.

C. M. W.

DAVID (Anna.) Note préliminaire sur un *Leishmania* trouvé chez le lézard gris de la région de Tibériade (Basse-Galilée, Palestine) [*Leishmania* found in a Grey Lizard in Lower Galilee.]—*Ann Parasit Humains et Comparée* 1929 May 1 Vol. 7 No. 3. pp 190-192. [Microbiol. Inst. Hebrew Univ Jerusalem]

By cultivation of the heart blood of sixteen lizards (*Agama stellio*) in Palestine, the author was able to demonstrate that four of them were infected with leishmania, flagellates of the leptomonas type appearing in the cultures. Examination of the alimentary canal of the lizards did not reveal any intestinal infection but prolonged blood examinations revealed on one occasion a single mononuclear leucocyte containing sixteen parasites of the typical leishmania form.

C. M. W

BLOCH (J. I.) [Sur la préparation des cultures de la *L. tropica* pour les vaccins.] —*Pensée Méd d'Uzbekistans* Tashkent. 1929 No. 5 pp 90-91 [4 refs.] [In Russian.]

DÍAZ (Navarro) Un caso más de leishmaniosis visceral.—*Medicina Paises Cálidos* Madrid 1929 Mar Vol. 2 No. 2. pp 137-138

TROPICAL MYCOLOGY

CASTELLANI (Aldo) Fungi and Fungous Diseases. Lectures I-III—*Arch. Dermat. & Syph.* 1927 Oct.-Dec. Vol. 16. Nos. 4-6. pp. 383-425 51-604 714-740. With 45 figs. [16 refs.]
1928. Jan.-Mar. Vol. 17. Nos. 1-3 pp. 81-87 With 3 figs. [2 refs.] 194-220. [1 ref.] 354-378. With 44 figs. (4 coloured plates) 23 refs.]

This series of 6 papers comprises two lectures delivered by the author at the University of Illinois in 1926 each lecture supplying material for three papers. In the first three papers (lecture I) the author gives a general outline of elementary mycology and a general review of classification with special reference to the medical aspect of the subject. In this lecture he also describes the phenomenon which he terms "symbiosis" between bacteria and fungi. The author's method of utilizing the fermentation powers of certain lower fungi for the identification of various carbohydrates, and its application to urine analysis, is also described.

The second lecture forming the last three papers, deals with fungous diseases. Short accounts of the different mycoses are given, together with lists of the fungi known or suspected to be the causal agents, clinical description diagnosis prognosis treatment, and, in many cases, descriptions of illustrative cases. The first of these three papers deals with internal mycoses including thrush, stomatitis, bronchomycoses, tonsillomycoses and mycoses of the nervous system, sensory organs and genito-urinary organs. The last two papers deal with dermatomycoses, including trichomycoses, cryptococcoses, blastomycoses, various tinea, pityriasis, scladiosis and mycotic pruritus.

P. Tate.

DE MAGALHÃES (Octavio) [In Portuguese & English.] *Ensaio de micologia. Studies on Mycology—Mem. Inst. Oswaldo Cruz.* 1928. Vol. 21. No. 1. In Portuguese pp. 173-180. With 6 plates. [8 refs.] In English pp. 181-189. With 6 plates. [6 refs.]

In Brazil during 13 months 8 cases of sporotrichosis were observed, two of them being of animal origin. *Endomyces albicans* was obtained for the first time in Pelotas in a large mouth lesion. Several ringworm fungi were seen including a new species of *Microsporum* which is described in detail and is named *M. circuluscentrum*.

P. T.

BARONI (Benigno). Sur un milieu de culture pour le développement et la conservation des champignons pathogènes. [A Culture Medium for Pathogenic Fungi.]—*C. R. Soc. Biol.* 1929 Apr. 19. Vol. 100. No. 12. pp. 994-995. [5 refs.]

The author finds a medium containing cocoa and cocoa-butter very good for isolating pathogenic fungi such as *Actinomyces*, *Oospora* and *Sporotrichum* and states that when grown on it they retain their virulence and that sometimes species which have lost their virulence as

a result of successive sub-culturing on ordinary media regain their virulence when grown on this new medium. It is made as follows —

Prepare broth with 300 grams of lean beef in 1 000 cc. distilled water cool, and filter. Heat the broth and add 5 grams rock salt 12 grams peptone—Witte or Chapoteaut—18 grams agar. Boil for 10 minutes filter warm and adjust to a slightly acid reaction. Add 15 grams commercial cocoa and 5 grams of very pure cocoa butter. Boil for 15 minutes and filter through gauze. Add 60 grams glucose mix well and distribute in tubes. Sterilize at 100 C for 60 minutes on three successive days.

P T

GALLOWAY (David) The Otomycosis of the Malay Archipelago commonly called "Singapore Ear"—*Malayan Med J* 1929 Mar Vol 4 No 1 pp 3-6.

Otomycosis is very common in the Malay Archipelago and is found in about 70 per cent. of all ear diseases and mostly affects Europeans. Now the causal fungus is most commonly an *Aspergillus*—*A. flavus* *A. niger* or *A. fumigatus*—but about 30 years ago *Mucor* was the commonest parasite. The symptoms are deep-seated and persistent pruritus varying degrees of deafness sensation of moisture in the meatus and the extrusion of scaly membranous or soapy material from the meatus. In cases where there is trauma of the meatus true inflammation supervenes and then pain dominates all other symptoms. Treatment consists in the application of dilute or strong antiseptics such as bichloride of mercury silver nitrate and boric acid according to whether trauma is present or not, for a few days and then syringing out the parasite. After treatment should be prolonged and should consist of daily application of antiseptic preparations.

P T

GREEN (Richard) Notes on a Case of "Black Tongue."—*Indian Med Gaz* 1928 July Vol 63 No 7 pp 381-384 With 5 text figs. [4 refs.] [Med. Research Inst. Kuala Lumpur F.M.S.]

The patient a male European aged 36 had the dorsal surface of the posterior two-thirds of the tongue coated with a moist black fur but was otherwise healthy. Budding yeast cells were present in scrapings and cultures of an organism believed to be *Cryptococcus linguas-pilosas* Lucet (1910) were obtained. The condition readily yielded to treatment with Lugol externally and an alkaline gentian mixture internally.

P T

REDAELLI (Piero) Studi sulla Nocardiasi sperimentale. Actinomicosi, Streptomicosi. Parte I Infezione primaria, basi anatomiche e fattore cellulare della immunità naturale. Parte II Basi anatomiche e fattore cellulare della immunità acquisita. [Studies on Experimental Actinomycosis. Part I. Primary Infection and Cellular Factor in Natural Immunity Part II. Anatomical Basis and Cellular Factor in Acquired Immunity—*Bol. d. Istituto Sieroterap. Milanese*. 1928. Feb Mar & May Vol 7 Nos. 2 3 & 5 pp 75-101 121-135 With 8 plates (3 coloured) [21 refs.] English summary p. 134 pp. 239-265 [25 refs.] English summary p. 264 [Inst. of Path. Anat. Univ. Pavia.]

Using the species *Nocardia* [*Actinomyces*] *sanfelicei* n. sp. (=acid-fast Streptothrix described by SANFELICE 1921) the author studied the

primary infection and cellular factor of natural immunity in receptive animals (guinea-pigs rabbits) less receptive animals (dogs) and in refractory animals (fowl)

In less receptive and refractory animals there is a more ready reaction on the part of the organism which results in the rapid extinction of the disease in refractory animals and in the passage of the disease to the chronic state in less receptive animals. Thus, less receptive and refractory animals appear to be more sensitive to the parasite and to have the power of reacting more rapidly

Repeated small doses of *Nocardia san/disci* into receptive animals sometimes induce in them a state of hyper receptivity and sometimes a state of hyper-resistance. It was not possible to determine why these different conditions were caused in apparently similar animals

P T

LEAO (A. E. de Arêa) Réactions sérologiques dans l'actinomycose (agglutinines précipitines et fixation du complément). [Sero-logical Reactions in Actinomycosis].—C. R. Soc. Biol. 1923. Sept. 18. Vol. 89 No. 26. pp. 878-880 [Oswaldo Cruz Inst. Rio de Janeiro.]

The Actinomyces was isolated from a case of generalized actinomycosis. Cultures on ordinary agar 15 days old, were triturated and emulsified in physiological salt solution, with the addition of 2 per cent. of formalin. 1 cc. of this emulsion and 1 cc. of diluted serum were incubated at 55° C. for 4 hours and then at 37° C. for 12 hours. Dilutions of 1 in 10 and 1 in 20 gave agglutination which was apparent after 4 hours, and there was distinct agglutination up to a dilution of 1 in 160.

Filtrates of cultures on ordinary broth did not give a precipitate reaction with any dilution of serum or filtrate starting with 1 in 10.

Two antigens were tried, emulsified cultures in normal salt solution, and filtrates from cultures on ordinary broth. The latter was the better and gave complete fixation with 0.1 cc. to 0.01 cc. serum. This was a group reaction for other mycoses, especially Coccidioides granuloma, but it was given in much higher dilutions in cases of actinomycosis.

P T

DE LA GUARDIA (Jaime) A Case of Facial Actinomycosis.—Sisler's Ann Rep Med Dept United Fruit Company Boston, Mass. 1927 pp 163-165 With 3 text figs. [Preston Hosp., Cuba.]

The subject was a young Cuban woman with good general health. An actinomycotic tumour involved the temporal, maxillary and zygomatic regions with a central granulomatous ulcer forming the opening of a fistulous tract. Treatment was effective and consisted of excision and curettage of the fistula and granulomatous tissues, and cauterization of the area with pure carbolic acid followed by dressings with 50 per cent. Iodo and intravenous injection and oral administration of sodium and potassium iodides.

P T

BLANC (Georges) CAMINOPETROS (J) & JOANNIDÈS (Georges) Chronique de l'Actinomycose en Grèce—[Actinomycosis in Greece.]—*Bull Soc Path Exot* 1928 June 13 Vol 21 No 6 pp 432-435 [Pasteur Inst. Athens]

Report of 2 cases both fatal, of pulmonary actinomycosis with cold abscesses from both of which the *Cohniastreptothrix israeli* was obtained in anaerobic cultures

W Jenkins Oliver

STOVALL (W D) & GREELEY (Hugh P) Bronchomycosis. Report of Eighteen Cases of Primary Infection in the Lung—*Jl Amer Med Assoc* 1928, Nov 3 Vol. 91 No 18. pp 1346-1351 With 8 text figs. [1 ref.]

Yeast like fungi identified as *Monilia* were isolated from 18 cases of pulmonary disease in which they appeared to be primary infections. The clinical aspect varied from mild illness to severe cases resembling tuberculosis. In most of the cases the symptoms were less severe than would be expected in view of the degree of pathological change and consisted in moderate cough with scanty expectoration fever if any of low type and leucocyte count varying from normal to seldom more than 10 000 per cmm. The fungi from all cases appeared to be the same except that 12 were pathogenic for laboratory animals while the other 6 were not. Five of the cases are described in detail.

P T

TALICE (R. V) & MACKINNON (J E) *Penicillium bertai* n. sp. agent d'une mycose broncho-pulmonaire de l'homme [Penicillium bertai n. sp., causing Broncho-Pulmonary Mycosis in Man.]—*Ann Parasit Humains et Comparés* 1929 Mar 1 Vol. 7 No 2 pp 97-106 With 1 text fig [12 refs] [Parasit Lab Faculty of Med., Paris]

Cultures of a fungus were obtained on three different occasions from the sputum of a case of pseudo-tuberculosis in which acid fast bacilli could not be detected directly or by guinea pig inoculation. The fungus is considered to be a new species of *Penicillium* belonging to the sub-genus *Aspergilloides* and is named *Penicillium bertai*. Inoculation of a guinea pig and a rabbit with the sputum, and intravenous inoculation of a rabbit with a spore suspension, gave negative results

P T

CASTELLANI (Aldo) Certain Bronchomycoses which may simulate Pulmonary Tuberculosis.—*Jl Trop Med & Hyg* 1929 Jan 1 & 15 Vol 32 Nos 1 & 2. pp 1-8 17-22 With 14 text figs [2 refs]

These papers contain a general account of various fungous diseases which may simulate pulmonary tuberculosis together with descriptions of illustrative cases.

P T

PERUCHENA (José G) Sobre un caso de monilliasis pulmonar [A Case of Pulmonary Monilliasis.]—*Semana Méd* 1929 Feb 28 Vol. 36 No 9 (1833) pp 527-535 With 12 text figs. [20 refs]

A man of 45 years complaining of cough, worse at night, fatigue and sweating. There were scattered rales over the right side the temperature was normal. Radioscopy showed an infiltration of practically the whole of the upper lobe of the right lung. Tubercle bacilli were not found, but a *Monilia* was cultivated which differed from the known species in fermenting

laevulose and maltose only with gas production, slightly acidifying galactose and arabinose, and producing slight acid in milk without clot. The name proposed for it is *Monilia platensis*. The patient rapidly recovered after administration of potassium iodide and the physical signs completely disappeared in a month.

H. Harold Scott.

RIBEIRO DA FONSECA (Olimpio Oliveira). *Ensaio de revisão de las blastomycosis sud-americanas.* [Review of the South American Blastomycoses.]—*Prensa Méd Argentina*, 1928, Sept. 30, Vol. 15, No 12, pp. 513-536. With 19 figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

Diseases due to fungi are commonly regarded as among the most difficult in human pathology and of these some of the most obscure are those denominated blastomycoses. With a view to throwing light on these dark places the author describes the four chief blastomycoses met with in S. America. They are (1) Granuloma coccidioides, Posadas-Wernicke disease caused by *Coccidioides immitis* (2) American blastomycosis proper Gilchrist's disease, produced by *Mycoderma dermatitidis* (3) Rhinosporidium discovered by MALBRAX caused by *Rhinosporidium seberi* (4) Mazza and Parodi's mycosis associated with *Pseudococcidioides mazzae*. In the case of the first two the author gives an account of the history of the affection, the morphology and cultural characteristics of the parasites, the virulence in experimental animals and the symptoms, pathology and treatment of the disease they produce in man. Remarks on the third are limited to an account of the history the morphology and mode of growth. Of the fourth one case only has been recorded, that of an Argentine with a prelararyngeal abscess which opened and left a fistula, believed to be tuberculous until cultural examination showed the presence of a fungus which resembled *Coccidioides immitis*. Further investigation showed that it probably belonged to the Family Phytomycetaceae occupying a position between the Phytomyces and the Ascomycetes. It is believed to be a new genus which, on account of its resemblance to *C. immitis* has been named *Pseudococcidioides mazzae* after MAZZA, who, with PARODI observed this unique case in 1927.

H. Harold Scott.

BOIXE (C.) Over blastomycosen met beschrijving van een geval van chromoblastomycosis uit Sumatra. [On Blastomycosis, with Description of a Case of Chromoblastomycosis from Sumatra.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928, Vol. 68, No. 5, pp. 703-710. With 6 figs. on 3 plates. [8 refs.]

The name blastomycetes has lost its systematic significance from a botanic point of view. It is used for micro-organisms which, as seen in the tissues show some resemblance to yeast cells, but which belong to various groups, as can be shown by their cultivation on appropriate media.

Bonne quotes ROCHA LIMA's classification of the blastomycetes in six groups (*Verhandl. der Deutschen Pathol. Gesellschaft* 20e Tagung, 342, 1925) and gives a description of a case of chromoblastomycosis in a Batak male from Sumatra, who had suffered for about 7 years from this affection. The illustrations give a good idea of the case.

As far as appears from the literature on this subject blastomycosis is rare in the Dutch East Indies and no case of chromoblastomycosis has been published.

W J Bais.

SMITH (D C.) TURNER (H C) & SANDERSON (E S) *Systemic Blastomycosis, with Report of a Fatal Case.*—*Brit J Dermat & Syph* 1928 Aug-Sept. Vol. 40 Nos. 8-9 pp 344-359 With 7 figs on 3 plates [12 refs] [School of Med Univ of Virginia, Charlottesville.]

A case of blastomycosis in a man aged 42, a native of Virginia, terminated fatally after a duration of 7 months. The initial lesion occurred as a small nodule on the bridge of the nose which attained the size of a pea and then ruptured and discharged bloody purulent matter. Later similar but larger nodules were developed all over the body and the condition of the patient progressively became worse. At autopsy in addition to numerous sub-cutaneous abscesses lesions were found in the lungs but other organs were not infected. Numerous yeast like cells were present in pus from the lesions and in sections of the cutaneous and pulmonary lesions and cultures of a blastomycetes were readily grown from the pus. The fungus resembled those previously described from most cases of blastomycosis. Neither pus from the lesions nor cultures of the fungus were pathogenic for rabbits guinea-pigs or mice.

P T

SILVA (Flaviano) *Blastomycose generalizada. [Generalized Blastomycosis.]*—*Brasil Medico* 1928 Oct. 6 Vol. 42. No. 40 pp 1108-1112 With 3 text figs

The patient was a man of 39 years complaining of a sore which had started in the mouth four months before he came under the author's observation. By this time it had spread in the form of an ulcer with fungating edges involving both lips and the gums. Soon the cervical glands became enlarged and later other glands and in spite of treatment at first with large doses of potassium iodide (up to 12 gm. in the day) and afterwards with other drugs the disease progressed and there was marked emaciation preceding death which occurred six months after he was first seen. Foci were found in the liver and the spleen, and microscopically were tubercloid but without any caseation. *Coccidioides immitis* was cultivated from the lesions. The source was not discovered with certainty but the patient confessed to picking up vegetables in the fields and eating them raw. He was also syphilitic.

H. Harold Scott.

PEÑA CHAVARRIA (A.) *La blastomycosis de las mucosas naso-buco-faringea, según observaciones hechas en varios países de la América Latina. [Blastomycosis of the Mouth and Naso-pharynx in Latin America.]*—*Crónica Méd.* Lima. 1928. July Vol. 45 No. 781 pp 210-216.

The condition herein described is probably more common than is believed, owing to its resemblance to leishmaniasis and destructive syphilitic lesions and the consequent diagnosis being made of one of the latter. Its resemblance clinically to the former is fairly close but the microscope clears up the difficulty except when the two co-exist. The lesion starts as a small ulcer which spreads rapidly destroying

soft tissues, then cartilage, and rarely even bone, so that perforation of the palate ulceration and destruction of the nose, pharynx and larynx produce a most unsightly condition.

In some cases, while destruction is progressing at one part, hypertrophy resembling rhinoscleroma, for example may be seen at another.

H. Harold Scott.

DE ALMEIDA (Flomano Paulo) Aspectos histologicos dos casos de blastomycose verificados em S. Paulo. [Histology of Blastomycosis as met with in S. Paulo.]—*Brasil-Médico*. 1929. May 4. Vol. 43. No. 18. pp. 485-489. With 21 figs.

The author has met with 160 cases of blastomycotic infection in various states of Brazil. 90 per cent. of them occurred in S. Paul. He has studied histologically 60 of them and describes the appearance of the fungus when stained by the Goodpasture-MacCallum or Gram-MacCallum method. In many the parasite showed as a single darkly staining spherical mass which might be made up of closely aggregated minute granules. In others the internal structure was looser and the periphery was bounded by a circle of granules. Occasionally the individual bodies were smaller and disposed either in pairs or rarely in chains of five or six elements. [The tissue reactions to the presence of the parasite are not described and unfortunately the microphotographs are too faintly reproduced to be of much value in this respect].

H. Harold Scott.

SPRING (Dorothy) Comparison of Seven Strains of Organisms causing Blastomycosis in Man.—*Jl Infect Dis.* 1929. Mar. Vol. 41. No. 3. pp. 169-185. With 5 text figs. [11 refs.] [School of Med. Univ. of Pennsylvania, Philadelphia.]

Seven strains of fungi isolated from cases of American blastomycosis of Gilchrist were compared as regards cultural characters, growth in hanging-drop, fermentation tests, resistance to dyes and heat and pathogenicity to animals. The various strains were found to differ markedly in all these respects. Animal inoculations showed that chickens are not susceptible to subcutaneous inoculation, rabbits are only slightly susceptible even to intravenous inoculation, guinea-pigs are comparatively resistant, white rats are comparatively susceptible to infection although it is not fatal to them, and white mice are the most susceptible of the animals tested and are the only ones in which generalization of the disease occurred.

P. T.

HOFFMANN (W. H.). La cromoblastomicosis en Cuba y la enfermedad de Guiteras o Chappa. [Chromoblastomycosis in Cuba and Guiteras's Disease, "Chappa."]—*Rev. Méd. Cubana*. 1928. Apr. Vol. 39. No. 4. p. 420.

Professor Hoffmann states that the various affections included under the term "blastomycosis," namely the European form of Bockhart and Busse, produced by *Saccharomycetes*, the American form, Gilchrist's disease, due to a *Cryptococcus*, Lacomel's South American form, confused with leishmaniasis, and Fonseca's Brazilian form, *Granuloma*

coccidioides should really be denominated *Ascomycetes*. The causative fungus is believed to live saprophytically on the skin but when it gains entrance through an abrasion or other wound it assumes pathogenic properties and may lead to extensive ulceration. The affection described by READ in 1901 under the name chappa and of which ten cases have been studied by GUTTERAS is considered one of the same group. It starts as a small circumscribed focus in the skin at the site of a superficial lesion, and by extension an ulcer results which involves even bones and joints and produces great deformity although the general state remains unaffected unless secondary infection supervenes.

H. Harold Scott.

JACOBSON (H. P.) *Coccidioidal Granuloma*.—*California & Western Med* 1928. Dec. Vol. 29 No. 6. pp 392-396. [1 ref.] [General Hosp Los Angeles.]

Four cases of Coccidioidal granuloma are described, in all of which treatment with colloidal copper was given. One case terminated fatally but in the other three cases the treatment resulted in great improvement and possibly in cure.

P T

TOMLINSON (C. C.) & BANCROFT (Paul) *Granuloma Coccidioides*. Report of a Case responding favourably to Antimony and Potassium Tartrate.—*Jl Amer Med Assoc* 1928 Sept. 29 Vol. 91 No 13 pp 947-950 With 6 text figs [11 refs.] [College of Med. Univ of Nebraska, Omaha.]

This case of Granuloma coccidioides which occurred in a man aged 26 appears to have arisen as a laboratory infection through working with cultures of *Coccidioides immitis* [*Mycoderma immitis*]. For a period of three months intravenous injections were given of 1 per cent. antimony and potassium tartrate on alternate days in doses varying from 2 to 8 cc. During the same period half a skin unit of unfiltered X ray was given at intervals of 10 to 14 days. This treatment apparently resulted in a complete cure and the patient has been in excellent health and free from all symptoms for twelve months.

P T

1. REIMANN (Hobart A.) KUROTCHKIN (Timothy G.) & Tso (Edith) *Studies on the Etiology of Splenomegaly of Unknown Origin (Splenic Mycosis?)*.—*Proc Soc. Experim Biol & Med.* 1929 Mar Vol. 26 No 6. pp. 410-413. With 2 text figs. [9 refs.]
- ii. HU (C. H.) REIMANN (Hobart A.) & KUROTCHKIN (Timothy G.) *Filaments in Siderotic Nodules of Spleen in Cases of Splenomegaly of Unknown Origin*.—*Ibid* pp 413-416. With 3 text figs. [9 refs.] [Peking Union Med. College Peking China.]

1. Spleens and portions of liver were examined from 3 cases of splenomegaly and one of cirrhosis of the liver occurring in Northern China. Inoculation of crushed splenic pulp on Sabouraud's medium gave cultures of fungi in each case but no growth was obtained in tubes inoculated with liver. The fungus from one case resembled a *Penicillium* and proved to be pathogenic for rabbits guinea-pigs and mice. The fungus from the other 3 spleens is as yet unclassified and was not pathogenic for laboratory animals.

ii. The authors found that by appropriate staining methods the mycelial-like filaments present in siderotic nodules from cases of splenomegaly may be seen to be continuous with normal tissue fibres. They also found that the staining reactions and morphology of these filaments are different from those of fungi isolated from the same spleens. Hence they conclude that the filaments in the nodules are not fungous hyphae.

P T.

DA FONSECA (Olympio) & LEAO (A. E. de Arêa) [In Portuguese & English.] A questão das esplenomegalias micóticas. The Question of Mycotic Splenomegaly.—*Inst. Oswaldo Cruz Suppl. mento das Memorias* 1928. Aug. 31 No. 1. In Portuguese pp. 10-15. With 2 text figs. & 3 figs. on 2 plates. In English pp. 16-22. [24 refs.] [Oswaldo Cruz Inst. Rio de Janeiro.]

The recent discussion as to the mycotic origin of splenomegaly led the authors to reinvestigate the material from cases of splenomegaly in the Oswaldo Cruz Institute. Some cases showed ill-defined Gandy Gamma nodules but in others the nodules were well-defined, and stained sections showed various structures superficially resembling mycelial elements. In no case however were undoubted fungus hyphae seen, and the authors agree with GAMMA and LANGERON that such structures are really formed by degeneration of the diseased tissues.

P T.

JAFFÉ (R. H.) & HILL (L. R.). Splenic Mycosis.—*Arch. Pathology* 1928. Aug. Vol. 6. No. 2. pp. 196-209. With 5 text figs. [18 refs.] [Dept of Path. Univ. of Illinois & Uihlein Memorial Lab. Grant Hosp. Chicago.]

Siderotic nodules resembling those described by NAXTA, WEL and others, were found in spleens from two cases of juvenile splenomegalic anaemia, three cases of sickle-cell anaemia and one case of tuberculosis of the spleen. Structures believed to be fungous hyphae and fructifications were present in the nodules and from one case of juvenile splenomegalic anaemia cultures of a fungus resembling *Aspergillus fumigatus* were obtained. The authors consider that the anaemia is not caused by the fungus, and favour the view that pathological changes in the spleen predispose it to invasion by various *aspergilli*.

P T.

NAXTA (A.) Splénomégalie aspergillaire expérimentale et splénoite mycotique spontanée de l'animal. (Experimental Aspergillary Splenomegaly and Spontaneous Mycotic Splentitis of Animals).—*C. R. Soc. Biol.* 1928. Dec. 14. Vol. 99. No. 36. pp. 1785-1787. 2 refs.]

Cases of spontaneous splenitis of the pig appear to be due to an Actinomyces. The author suggests that cases may be due to active mycotic forms of *Aspergilli* such as were obtained experimentally by LICHT and others with *Aspergillus fumigatus* and *Sterigmatocystis nidulans*. He has described actinomycotic forms of *S. mouton* following experimental inoculation of animals and he considers that these forms may be important in relation to splenomegaly in man, which he and others believe to be of mycotic origin.

P T.

CLEMENTE (Giuseppe) Sulla micosi sperimentale della milza. [Experimental Mycosis of the Spleen.]—*Patologica*. 1928. July 15 Vol. 20 No 441 pp 335-343 With 9 figs. on 2 plates. [16 refs.] [Inst. Clin. Chirurg Univ Palermo]

In a certain number of cases of splenomegaly organisms of a streptothrix (GIBSON) or mycotic nature (NANTA PINOY) have been found on histological examination and have received various names—*Aspergillus* or *Sterigmatocystis nidulans* *A. nantas* etc.—but the only sure conclusion has been that it is an *Aspergillus* but not *A. fumigatus*. The malady has been regarded as a new disease of the spleen, part of the large group splenomegaly. Thus, OBERLING has studied 200 cases of splenomegaly and has reported lesions of Nanta's mycosis in four cases of Banti's disease two of haemolytic jaundice several of cirrhosis of the liver a lymphocytic leukaemia and an infarct of spleen in a subject with arteriosclerosis.

Two questions arise (1) Is the lesion a mycotic one at all? (2) If it is is the disease due primarily to the mould, or is this a secondary invader of an organ already affected from some other cause? GAMNA, ZORINI and LANGERON among others deny the mycotic element and consider the filaments to be the result of regressive changes in collagen fibrils or of necrosis and disintegration of elastic and connective tissue elements. The important fact remains that up to the present the lesions found have not been reproduced experimentally in animals.

The author inoculated into the spleen of guinea-pigs rabbits rats and dogs emulsions of spores of a ten-day culture of *A. fumigatus*. Certain lesions resulted which are described in the text and illustrated by microphotographs and these corresponded closely with those found by NANTA.

[The above abstract has been given because a subject so important as this should be widely known in order that more intensive work may be undertaken to solve the problem but in the opinion of the reviewer the author's experiments are beside the mark they merely prove that injection of spores of *A. fumigatus* into the spleen will produce certain results there and leave untouched the main question as to whether what was seen by NANTA and PINOY are moulds and if so whether they are pathogenic.]

H. Harold Scott

PETKETAKIS (M.) & PAPADOPOULOS (J.) Formes filtrables dans les cultures d'un champignon isolé d'un cas de splénomégalie égyptienne et intradermoréaction mycosique. [Filterable Forms in Cultures of a Fungus isolated from a case of Egyptian Splenomegaly and Mycotic Intradermal Reaction.]—*C. R. Soc. Biol.* 1928 June 29 Vol. 99 No. 22. pp. 274-275 [1 ref.]

Cultures on ordinary broth of a fungus isolated from a case of Egyptian splenomegaly were incubated for 7 days and filtered through an L candle. No micro-organisms were detected in the filtrate by direct examination staining or after centrifugation and inoculation of the filtrate on Sabouraud's agar was negative. On incubation the filtrate showed cloudiness on the 4th day and rare coccus-like organisms were present. Bacillary forms appeared on the 5th day and in from 7-10 days mycelium developed which resembled that of ordinary

cultures of the fungus. After 4 days incubation the filtrate gave rise to cultures of a similar mycelium when inoculated on Sabouraud's medium.

Intradermal injection of 1 cc. of the filtrate into a subject with splenomegaly caused no reaction but similar injection of 0.25 cc. of the filtrate into a normal subject resulted in an intense reaction lasting 48 hours.

P. T.

FAWCETT (John) & GIBSON (A. G.) A Case of Splenic Anaemia due to a Streptothrix Organism.—*Lancet* 1922. June 9 pp. 1171-1172. [6 refs.]

A Streptothrix was cultivated on serum broth from the Gandy-Gamma nodules present in the spleen removed from a case of splenic anaemia. Three intraperitoneal injections of cultures emulsified in saline proved pathogenic for a monkey (*Macacus sinicus*). The symptoms were gradual decline in health, enlargement of the spleen, persistence of appetite and tenderness of the abdomen with a terminal infection with the tubercle bacillus. The streptothrix was recultivated from the blood.

P. T.

LUSKHA (Marcello) Splenomegalie con micosi. [Splenomegaly with Mycosis].—*Riforma Med.* 1922. Nov. 26. Vol. 44. No. 48. pp. 1549-1560. With 3 coloured figs. on 1 plate & 1 text fig. [Refs. in footnotes.] [Inst. of General Clin. Med. Univ., Padua.]

This form of enlargement of the spleen which is not found to have any association with the usual conditions of splenomegaly is now being given the name of Primary thrombophlebitic splenomegaly. GAMMA himself named it Splenogranuloma sideroticum. Two cases are recorded with a well-reproduced coloured plate showing the histological changes in the spleen. The distinctive feature is the presence of Gandy-Gamma nodules. The important components of these are perivascular infiltrations, with aggregation of red corpuscles, fragments of hyphae believed to be *Aspergillus*, and multinucleated giant-cells some of which also contain hyphal fragments. The nodules seem to be definitely related in position to the vessels. The name sideroticum was given because of the presence of iron in the nodules. Nothing is known as to the aetiology.

H. Harold Scott.

PIKE (Albert A. F.) The Cultivation of an Organism from the Spleen in a Case of Banti's Disease.—*Jl Path & Bact* 1922. July Vol. 21. No. 3 pp. 591-593. 2 refs.] [Eastern District Hosp. Glasgow.]

Cultures of an Actinomyces-like organism were obtained on blood agar from the extirpated spleen in a case of Banti's disease.

DE VECCHI (Bando) Considerazioni istogenetiche sui cosiddetti "noduli di Gamma Gandy-Gamma Nodules".—*Haematologica*. Pavia. 1922. Vol. 9. No. 3 pp. 459-499. With 3 coloured figs. on 1 plate. [34 refs.] French Summary p. 499 [Inst. Anat. Path., Univ. Florence.]

Under this name are described certain small nodular deposits in the spleen. Their nature is not known. Several suggestions have been made the chief being that they are mycotic and due to *Aspergillus* (*Sterigmatocystis*) *nodulans*. This however is quite unproved, the histology of the

lesions being that of a granuloma the foci of which coalesce and in which pigment is either deposited or produced locally. In many cases they appear to be localized calcifications in the walls of the splenic vessels.

H Harold Scott.

PETZETAKIS & PAPADOPOULOU (J) Premier cas de mycétome de la rate observé en Egypte sur un champignon isolé en culture pure après ponction de la rate dans un cas de splénomégalie égyptienne [Egyptian Splenomegaly due to a Fungus Isolated in Pure Culture.]—*Bull et Mém Soc Méd Hôpôt de Paris* 1928 July 26 Year 44 3rd Ser Vol. 52. No 26 pp 1292-1294

This paper is the same as one previously published by the same authors [See this *Bulletin* 1928 Vol 25 p 751]

P T

CASTELLANI (Aldo) Blastomycosis and Some Other Conditions due to Yeast-Like Fungi (Budding Fungi).—*Amer J Trop Med* 1928 Sept. Vol. 8 No 5 pp 379-422. With 20 figs [13 refs] [Dept. Trop Med Tulane Univ of Louisiana, New Orleans]

This paper except for rearrangement, is essentially the same as one already published elsewhere. [See this *Bulletin* 1928, Vol. 25 p 742.]

P T

GALBREATH (W R.) & WEISS (Charles) Bronchomonilliasis. Report of a Case from Porto Rico.—*Arch Intern Med* 1928, Oct. Vol. 42 No 4 pp 500-507 [8 refs] [Presbyterian Hosp & School of Trop Med Univ of Porto Rico San Juan.]

This report was previously published in *Porto Rico Rev of Public Health and Trop Med* 1928. March. [See this *Bulletin* 1928 Vol. 25 p 747]

P T

MONTPELLIER (J) CATANEI (A) & CATTOIR. Sur un nodule dermique dû à une épine végétale souillée par un champignon. [A Dermal Nodule due to a Thorn infected with a Fungus.]—*C R Soc Biol* 1929 Feb 15 Vol. 100 No 6 pp 408-410

Cultures of an *Alternaria* were obtained from a thorn extracted from within a dermal nodule of 7 months duration.

P T

CASTELLANI (Aldo) I miceti e la medicina tropicale. Conferenza tenuta il 30 settembre 1928 in Torino al I Congresso Italiano di Medicina ed Igiene Coloniale.—*Riforma Med* 1928 Oct. 22. Vol. 44 No 43 pp 1377-1380 1383 With 3 text figs

MEDICAL ZOOLOGY

- i. FAIRLEY (N. Hamilton). The Present Position of Snake Bites and the Snake Bitten in Australia.—*Med. J. Australia*. 1929 Mar. 9 16th Year Vol. 1 No. 10 pp 296-313. With 5 text figs., 2 graphs & 23 figs. on 6 plates (1 coloured) [34 refs.]
- ii. ———. The Dentition and Biting Mechanism of Australian Snakes.—*Ibid* pp 313-327 With 14 figs. [10 refs.] [Walter and Elms Hall Inst. of Research, Melbourne.]

i. Very timely has the author been stirred to revive a brilliant chapter in the Australian annals of science, and it is with gratitude that one must notice his judicious confirmations and amplifications of it.

From his study of the records and from his own work he concludes that of the many venomous Australian land-snakes (the sea-snakes are not here included) the really deadly ones are in dismal precedence, the Death Adder (*Acanthophis antarcticus*) the Tiger Snake (*Natechis scutatus*) the Copperhead (*Demonia superba*) the Brown Snake (*Demansia textilis*) and the Black Snake (*Pseudochis porphyriacus*). In respect of the quality of their lethal power (as tested by subcutaneous injection of solutions of minimum lethal doses of their dry venom into sheep of 88 lb.) that of the Death Adder is 10 times, that of the Tiger Snake is 25 times that of the Copperhead $2\frac{1}{2}$ times, and that of the Black Snake is one-third, that of the Indian cobra. In respect of the volume of their lethal power (as estimated by the number of mortal doses contained in the average discharge of their venom-glands, as delivered at a single "milking" of the snake) that of the Death Adder would kill 84 that of the Tiger Snake would kill 118 that of the Copperhead would kill 8.9 and that of the Black Snake would kill 1.5 sheep of 88 lb. These are the numbers of mortal doses contained in the average of yields (far below the maximum yield obtained) and they are based on "milkings" of snakes in captivity—and captivity is known to be often inhibitory of the secretion of venom.]

The author duly emphasizes the very important point that the mortal issues of snakebite depend not only on virulence of venom but hang equally on the efficiency of the mechanism (of fang, jaw etc.) by which it is injected. When, as in the Death Adder the fangs are larger and the maxillae that carry them are shorter and more readily erectile then the strike will be surer and go deeper and more venom will get home and it is in this consideration that the Death Adder—which also has a larger command of venom—is here branded as the most dangerous of all Australian snakes. At the other extreme is the Brown Snake with short fangs long and little-mobile maxillae and the smallest and least prolific venom-glands.

The physiological effects of the five venoms are fully discussed in the combined light of the older observers and the author's own experiments. Like all colubrid venoms they all are powerfully neurotoxic, and it is the neurotoxin that the author calls their "killing constituent"—death being brought by paralysis of respiration. The author does not mention the Brown Snake but all the other four are also haemolytic and haemorrhagic and in sheep multiple haemorrhages can almost invariably be demonstrated after death, particularly in the lungs and in the subperitoneal tissue at the base of the mesentery but extensive

extravasation in the vicinity of the bite is rare. The venoms of the Tiger Snake (*Notechis scutatus*) and the Black Snake (*Pseudechis porphyriacus*) exercise furthermore an initial thrombotic power. Sheep that received only one lethal dose of the *Notechis* venom generally died in 1 to 4 hours from thrombosis of the portal vein and its tributaries, and the splenic vein might clot and the spleen be swelled to more than five times its normal weight. Larger doses were fatal in 20 minutes or less and then clots in the right heart were generally found. The venom of the Copperhead (*Demonia superba*) contains an anticoagulin in addition to the toxins first mentioned, but no thrombase.

On the practical side the clinical aspects and the treatment of snake-bite are described and discussed. The local lesions are slight as in Colubrids generally. Due but very necessary emphasis is placed upon the fact that the time and onset of the systemic manifestations depend upon the amount of venom injected. The fundamental principles of treatment are clearly explained with due insistence on the awful rapidity of absorption of venom. In respect of ligature it is admitted that even against these horribly lethal snakes it would have some utility in prolonging the precious time available for treatment if it could be applied immediately as under experimental conditions. In several experiments when 55 to 70 certain lethal doses of Tiger Snake venom were injected into the already ligatured leg of a sheep no symptoms followed so long as the ligature remained affixed (4 to 6 hours) though death ensued 2 to 2½ hours after its removal. Again, in another experiment, four sheep with forelegs shaved were allowed to be bitten in the foot by a Tiger Snake of average size (the snakes used were seen to bite effectively and residual venom could be milked from them afterwards) then an effective rubber tourniquet was affixed at the level of the upper part of the cannon bone, this being done immediately to three of the sheep and about two minutes after the bite to the fourth thereafter about 2.9 × 2.9 cm of skin and subcutaneous tissue bite included were cut away the wound was dressed with strong solution of KMnO_4 and the ligature left for 30 or 45 or 165 minutes. The one sheep that had not been ligatured immediately died 3 hours and 25 minutes after being bitten the other three showed no symptoms. This is the best that the author can find to say for immediate ligature combined with excision as a means of saving life after a really effective bite and the injection of a formidable charge of venom and this seems to have been hitherto the usual method of treating snake-bite in Australia. But now antivenenes for the two most deadly Australian snakes—the Tiger Snake and the Death Adder—are in process of manufacture.

From the local records of 281 cases the author finds that 56 per cent. were bites on the leg—all but 5 of the bites below the knee and 42 per cent. were bites on the arm—only 8 bites above the elbow. It is pointed out that most of those below the knee could have been prevented by boots and leggings or putties since a snap bite by a Tiger Snake on a sheep whose leg was clad in a thick woollen stocking proved fatal in an hour and 25 minutes but when a woollen stocking was covered by two layers of army regulation putti natural bites by both Tiger Snake and Death Adder were ineffective since the venom only got as far as the sock.

This bare abstract concentrates chiefly on the author's original work which is so critically combined with previous knowledge as to give the paper a very broadly educational value.

ii. This is a fine anatomical study full of descriptive detail and discerning comment and liberally illustrated, of the venom apparatus of the Proteroglyph colubrids, with special reference to the five deadly Australian species above named and to practical application in the diagnosis and prognosis of their bite. It includes the venom-glands, the suspensorium of the jaws the bones and muscles that give mobility to the palate and maxilla, the dentition, the poison fangs and their scope of movement as studied in moulds and models and by electrical stimulation of appropriate muscles in the living snake deprived of brain—in short all that rather intricate mechanism that give formidable accuracy to the injection of the venom. Its result shows that the Death Adder (*Acanthophis antarcticus*) has the most effective injecting apparatus, and the Brown Snake (*Diemania tessilis*) the least effective, with, in that order intermediate the Tiger Snake (*Notechis scutatus*), the Black Snake (*Pseudonotia porphyriacus*) and the Copperhead (*Denisonia superba*).

The more dangerous efficiency of the Death Adder is due to the facts that while its maxilla is the shortest in proportion to the skull (length of skull 3.72 times that of maxilla) and has its dentition reduced to 1 or 2 small teeth besides the very large functional fang, its quadrate bone is the longest in proportion to the skull (length of skull twice that of quadrate bone) this being a correlation of parts that confers a greater degree of mobility on the maxilla and consequently of elevation to the fangs in the act of biting (elevation of fangs = 40° to 50°). Indeed, in mobility of palate and maxilla, erectile power of fang, and proportional length of quadrate bone the Death Adder shows a suggestive approximation to the Viperids as the author observes—furthermore the Death Adder has a broad viperoid snout, which implies a broader space between the fangs and a wider distribution of venom and this broader interspace is one among the characteristic impressions left in a mould of its bite.

In the Tiger Snake the length of the skull is 3.58 times that of the maxilla and 2½ times the length of the quadrate bone, the possible elevation of the fangs is 30°–35° and the average number of teeth behind the fang is 3. In the Copperhead the length of skull is 3.4 times that of maxilla and 3.1 times that of quadrate the possible elevation of the fangs is 25°–30° and the number of teeth behind fang 4.5. In the Black Snake the length of the skull is 3.28 times that of maxilla, and 2.6 times that of quadrate the possible elevation of fangs 25°–30° and the number of teeth behind fang 4. In the Brown Snake the length of the skull is 2.68 times that of maxilla and 3.45 times that of quadrate, the possible elevation of fangs is 10°–15° and there are 7.25 teeth behind the fang. The osteological facts which, as the author remarks, show a graduated harmony from the Colubrine aglyph type to the Viperid type are extremely interesting, although the author is mistaken in supposing that his method of eliciting and stating them has in it anything novel to zoologists. [What zoologists will appreciate is not another instance of a familiar and fundamental method, but the evidence supplied by Fairley that this Crotaline-like *Acanthophis* seems to be a link between the Crotaline viperids and the Elapine colubrids and the support that the existence of this remarkable snake in Australia gives to the well-known theory of a former land or shallow-sea and island-chain connexion (in Miocene times) between Australasia and South America—wealth in Crotaline snakes being one of the characteristic features of the American fauna.]

A. Alcock

MEDICAL JOURNAL OF AUSTRALIA. 1929 Mar 16 & 23 16th Year
Vol. 1 Nos. 11 & 12. pp 336-365 372-394—Symposium on
Snake Bite. [Walter & Eliza Hall Inst. of Research, Melbourne.]

I. **Venom Yields in Australian Poisonous Snakes.** [FAIRLEY (N Hamilton) & SPLATT (Beryl)] pp. 336-348. With 1 graph.
[7 refs.]

I. In the introduction to this instructive paper the authors explain that accurate knowledge of the amount of venom that may be discharged by a given species of poisonous snake is necessary both for estimating the potential danger of its bite and for determining the quantity of antidote (antivenom) that may be required for the treatment. But when a snake bites it seldom discharges the whole contents of its venom glands so that for greater accuracy as well as for settling the practical question how far a snake continues dangerous after it has inflicted a first bite, it is necessary also to know how much (if any) venom (reserve venom) can be squeezed (milked) from the venom glands immediately afterwards. In the statistics of their work the authors use the term total venom as including both the venom discharged at biting and the reserve venom and the term primary yield to mean the total venom that can be obtained from a fresh captured snake.

The introductory remarks also include an account of the habits habitats and local distribution of the Australian venomous snakes critical notes on the care and feeding of snakes in captivity comments on the parasites and diseases of snakes and a full and critical account of methods of collecting and preserving venom.

The five Australian snakes here considered are (1) the Tiger Snake (*Notechis scutatus*) (2) the Death Adder (*Acanthophis antarcticus*) (3) the Copperhead (*Denisonia superba*) (4) the Black Snake (*Pseudochis porphyriacus*) and (5) the Brown Snake (*Diemania textilis*). Of No. 1 the average primary yield of 20 healthy snakes was 34.9 mgm. of dried venom and the highest individual yield 155 mgm. Of No. 2 the average primary yield of 41 mature snakes was 78.2 mgm. and the highest individual yield 235.6 mgm. Of No. 3 the average primary yield of 56 snakes was 40.1 mgm. and the highest individual yield 189.6 mgm. Of No. 4 the average primary yield of 6 snakes was 37 mgm. and the highest individual yield 74.8 mgm. From No. 5 although 7 specimens were milked no venom was obtained but TIDSWELL's thirteen observations are cited, who found the average yield of its dried venom to be 4.8 mgm. with a highest yield of 5.56 mgm.

The individual yields of venom in all the species vary very much large heavy snakes naturally give the highest yields and the authors emphasize the observation that individuals that have the fangs widest set apart can inject the most venom. Again, besides various circumstances in the natural or artificial environment that may affect the individual snake adversely the authors mention two pathogenous snake-parasites—a lung fluke (*Dolichopera maculipini*) and a larval tapeworm (*Sparganum*)—that may exercise a check on secretion of venom.

The statistics justify the authors conclusion that the Australian thanatophidia must be regarded as still very dangerous after they have bitten a victim—by reason of their large amount of reserve venom. For instance in 75 observations of Death Adders in which the average

although this venom is rich in thrombase, and although MARTIN had shown that ligature could protect rabbits from it and also from *Pseudechis* venom. (The explanation of this incongruity is that the rabbit is abnormally sensitive to thrombase, to which the sheep and goat are relatively insusceptible.) Ligature was equally ineffective against the venom of the Death Adder (*Acanthophis*) which does not contain thrombase. With venom of the Copperhead (*Demonia*) which also is destitute of thrombase one of a series of six ligatured sheep recovered after two days complete paralysis, and this recovery is thought to be due more likely to the natural resistance of the individual than to the ligature. Experiments on sheep under the same conditions with Indian Cobra venom confirmed the non-effectiveness of ligature except for slightly prolonging the interval before death—no evidence of the action of thrombase was found after death, so that in this as in other respects the venom of the Indian cobra resembles that of the Death Adder and Copperhead. Comparison was also made with Russell's Viper venom as a standard viperine venom. Three out of five sheep recovered after reception of 1 to 1.2 certainly lethal doses, and it is only reasonable to attribute this life-saving result to the effects of ligature—but on the other hand three out of four that received less than the estimated lethal dose died despite ligature—even in the fatal cases, however some modification of the clinical and pathological course resulted and the interval preceding death was prolonged. This testimony to the life-saving possibility of ligature in cases of bite from Russell's Viper is in harmony with the observations of ACTON and AKOWLES.

Though these careful experiments on sheep discredit ligature as a therapeutic measure for the bites of Australian Elapines, they do not discountenance its value as a means of prolonging life and affording time for other treatment in all other countries.

A. A.

MEDICAL & SCIENTIFIC ARCHIVES OF THE ADELAIDE HOSPITAL. 1927
No. 7 pp. 18-20—Fatal Case of Tiger-Snake (*Notechis anchieta*) Bite.

The victim was bitten in the left arm (only one puncture was observed subsequently) and, believing himself to be immune, he simply sucked the wound and applied a ligature to the arm—but he very soon had nausea, headache and pain in the axilla. Vomiting quickly followed, the vomit at last becoming dark-coloured. When admitted to hospital about 8 hours after being bitten, the victim was showing signs of paralysis—staggering, dyspnoea, diplopia, ptosis—the circumference of the wound was ecchymosed and the whole arm was swollen, there was constant desire to defaecate and micturate and the urine contained blood. The bitten part was then excised and the wound treated with solid $KMnO_4$. Later some sort of African antivenom was injected intravenously and stimulants were given. Vomiting of dark brownish material continued at intervals, bleeding from the wound gave trouble the patient became cyanosed and drowsy as difficulty of respiration developed, his temperature sank to $95^{\circ}F$ and he died 20½ hours after being bitten. After death the blood remained fluid but the corpuscles appeared to be intact. The symptoms in this case illustrate well the neurotoxic and hæmolytic properties so characteristic of the venom of the Australian Elapine snakes.

A. A.

KOPSTEIN (F) Observations on the Effect of the Venom of the Javanese "Green Snake," *Lachesis gramineus*—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1928. Vol. 17 Pt 4 pp 573-582.

Lachesis gramineus is one of the commoner pit vipers of Oriental jungles. In this discursive account of the effects of its bite which begins with a case that occurred in 1863 the systemic effects seem to be negligible, and the local effects to be those generally characteristic of viper bite, namely haemorrhage persistent pain swelling that may spread far from the site of the wound, and a subsequent tendency to gangrene, in bad cases. A. A.

KOPSTEIN (F) Opmerkingen over de gifwerking van de Javaansche Groene slang *Lachesis gramineus* [Toxic Effect of the Javanese "Green Snake" *Lachesis gramineus*]—*Geneesk. Tijdschr. v. Nederl. Indië*. 1928. Vol. 68. No 7 pp 1035-1047

There are three green snakes living on trees in Western Java, where the author carried out his investigations viz. *Coluber oxycephalus* (non-toxic) *Dryophis prasinus* (slightly toxic) and *Lachesis gramineus* (highly toxic) Records of man being bitten by this snake are rare in those parts. He collected seven cases. In all of them the local symptoms predominated (oedema, excruciating pains once necrosis and gangrene of the bitten finger) All recovered after treatment with serum. Experiments on susceptible animals (chicken a squirrel, *Rousssethis amplexicaudatus* house rat, paddy bird) showed that the toxic effect among them was more marked by the general symptoms affection of the central nervous system. Lizards (*Mabua multifasciata*) were not susceptible. Nor were snakes (*Tropidonotus piscator*) contrary to their reaction to the poison of *Naja tripudians sputatrix* to which all snakes examined by Kopstein even *Naja* itself are highly susceptible.

N. H. Swellengrebel.

ROPPONGI (H.) Toxikologische Untersuchungen ueber das Mamushi Schlangen-Gift. [Toxicology of the Venom of the Mamushi (*Ancistrodon blomhofsi*)]—*Fukuoka Ikudagaku Zasshi (Fukuoka Acta Med)* 1928. Dec. Vol. 21 No 12 [In Japanese. German summary pp 109-113]

The Mamushi (*Ancistrodon blomhofsi*) is the only venomous snake of the Japanese Islands proper and is very common in Kyushu I. The average amount of a single yield of venom is 100 mgm. (33 mgm. dried) Subcutaneous injection of a M.L.D. (=1 mgm. dry venom) into a frog is followed by general haemorrhage around the site of injection, central motor paralysis and stoppage of the heart. Intra venous injection of a M.L.D. (=1 mgm. of dry venom per kilo. of body weight) into a guineapig causes at first increased respiration rise of temperature appearance of albumin and casts in the urine leucocytosis and diarrhoea, and then leucopenia, fall of temperature dyspnoea cyanosis and sudden stoppage first of the breath, then of the heart. If the injection be subcutaneous (=3 mgm. per kilo) there is also bloody oedematous swelling at the site of injection which may be followed by necrosis with dark sanious discharge.

The effects of Mamushi-bite [presumably in man] are stinging pain locally with sanguineous oedema, discolouration of the skin, and spreading swelling—dull pain along the course of the lymphatics, fever, headache and faintness or general languor, diminished urine with albuminuria and casts, and general oedema.

Post-mortem in the guinea-pig there is evidence of injury to the walls of the blood-vessels (particularly those of the thoracic and abdominal cavities and viscera after intravenous injection of the venom) but not confined to the vessels. The venom in short is described as haemorrhagic.

A. A.

HARA (Y.) Experimental Studies on the Poisons of Formosan Snakes. I. A Contribution to the Knowledge of the Blood Pictures produced by 3 Kinds of Snake Poisons.—*Taiwan Igakkaï Zasshi* (Jl Med. Assoc. Formosa) 1928, Oct. No. 283 [In Japanese—English summary pp. 69-70] [Govt Hosp. Harenko Formosa, Japan.]

The author gives some details of the effects of the venom of 3 Japanese species of snakes (2 *Lachesis*, *Anistrodon*, *Bungarus*, *Naja*) on the corpuscles of the blood of rabbits—and he states that the effects of the venoms of these snakes cannot be differentiated by the blood-pictures alone.

A. A.

KRAUS (R.) Zur Frage der Serumtherapie der Bisse europäischer Vipern [Serum-Therapy for Viper Bite in Europe].—*Wien. Klin. Woch.* 1929, Feb. 28, Vol. 42, No. 9, pp. 263-264. With 2 text figs. [State Serotherapy Inst. Vienna.]

The relevant facts recounted in this paper are that the immunizing serum or antivenom for the South American and West Indian Viperid *Lachesis lanceolata* neutralizes not only (as VITAL BRAZIL has shown) the venom of other species of South American vipers, but also (as the author and MORITZ have shown in separate papers abstracted in this Bulletin Vol. 24 p. 404) the venom of the common European viper *V. aspis*.

The object of the present paper is a practical one—namely to advocate drawing upon the copious supplies of this viper venom available in South America for the production of an antivenom for the treatment of viper bite in Europe.

A. A.

OTTO (R.) Vergleichende Untersuchungen mit Schlangengiftserum und Viperngiften verschiedener Herkunft. [Action of Specific Snake Antivenoms on Alien Viper Venoms].—*Ztschr. f. Hyg. u. Infektionskr.* 1928, Dec. 15, Vol. 109, No. 2, pp. 272-285 [2 refs.] [Robert Koch Inst. Berlin.]

In the experiments here tabulated the European viper antivenom of the Paris Pasteur Institute did not neutralize venom of South American or Javan *Crotalinae*—with the very doubtful exception of *Anistrodon*. The polyvalent antiophidic serum of the Butantan (Brazil) Institute neutralized the venom of the European *Viper aspis* and of the Javan *Anistrodon rhodostoma*—and the antithrope serum of this Institute although it failed of effect against the Javan snake-venom, neutralized the venom of the European viper—but not to

the same degree as the antiothrops serum did. The polyvalent anti viperine serum of the Bandoeng (Java) Institute was active against European viper venom by the subcutaneous but not by the intravenous route but it did not neutralize the South American crotaline venom. In all these experiments appropriate mixtures of antivenom and venom were injected into guineapigs. [For antecedents of this paper see KRAUS and MORITSCH this *Bulletin* Vol. 24 p. 404]

A. A.

OTTO (R.) Untersuchungen ueber die Toxine europäischer Vipernen. [Studies of the Venoms of European Vipers.]—*Ztschr f Hyg u Infektionskr* 1929 Feb 17 Vol. 110 No 1 pp 82-92 [3 refs.] [Robert Koch Inst. Berlin.]

The author's experiments here fully recorded, show that the venoms of the different species of European vipers differ in lethal virulence in resistance to heat and in their reactions to foreign antivenoms.

A. A.

GITHENS (Thomas S) & BUTZ (Lewis W) Venoms of North American Snakes and their Relationship — *Jl Immunology* 1929 Jan. Vol. 16. No. 1 pp 71-80 [Antivenin Inst. of America Glenolden Penn.]

The venoms of six species of rattlesnakes (*Crotalus*) studied by the authors were found to contain identical or almost identical toxic principles. The toxic principles of the Copper head (*Ancistrodon contortrix*) and moccasin (*A. piscivorus*) are identical with one another or almost so but differ to some extent from those of the rattlesnakes. The venom of the dog faced rattlesnake (*Crotalus terrificus*) of Central and South America and that of the fer-de-lance (*Lachesis atrox*) contain principles that differ entirely from those of the North American rattlesnakes in their antigenous properties. The authors draw attention to the fact that rattlesnake venoms contain in addition to their acutely toxic principles other components which have the power of binding the antibodies of an immune serum but are not acutely toxic (to pigeons)

A. A.

BULLETIN OF THE ANTIVENIN INSTITUTE OF AMERICA. Philadelphia, Pa. 1929 Feb. Vol. 2. No 4 pp 81-109

The following items are suitable for notice —

(1) A short note on a case of a woman bitten (on a finger) by a *barba amarilla* or fer-de-lance (*Lachesis atrox*) nearly six feet long. When brought for treatment nearly 11 hours afterwards she was almost collapsed, and was bleeding freely from wound, mouth and rectum. The hand and arm were swollen. An injection of 10 cc. of a specific antivenom was given at once that and ice to the hand and arm being the only treatment employed. Bleeding did not stop until 24 hours afterwards. The patient was discharged whole in ten days. (2) Another double case of accident due to a *barba amarilla*. Here a man was bitten (on the leg) and his wound, which was bleeding very freely, was being bathed by his wife, whose fingers were abraded by constant use of a nutmeg grater. The case was being treated by a snake-doctor

The husband died in two hours, and his wife died, with all the symptoms of *Lachesis atrox* poisoning the following morning. (3) A note on the venom of a pigmy rattlesnake *Sistrurus catenatus* which though extremely small in amount (average $5\frac{1}{2}$ to 6 mgm.) is very virulent (0.03 mgm. being the lethal dose for a pigeon). (4) A note on the venom of the spider *Latrodectus mactans* an intravenous injection of 0.5 mgm. of which killed a guinea-pig of 245 gm. within several hours. (5) A report on a microscopical and chemical examination of a "scorpion stone" said to be good also for snake-bite. A black, porous odourless, tasteless coke-like substance burning to a white ash specific gravity 1.11 capable of absorbing 53.42 per cent. of its own weight of water in ultimate analysis bone charcoal. Minute white crystals in its pores are soluble in water and in alcohol and appear to contain a volatile oil of plant origin. (6) A reprint from the *Journal of Immunology* of a paper on the Venoms of North American Snakes and their Relationship a summary of which is given here independently.

A. A.

DE ASSUMPTIO (Lucas). Contribuição ao estudo da dosagem dos sêros anti-peçonhentos. Confronto entre dosagens pela determinação dos anticongulmas específicos do plasma e o poder antitóxico do sêro. (Study of Antivenomous Sera.)—*Inst Hyg de São Paulo Bol.* No 2. 25 pp. 1^o refs. English summary p. 26. (Reprinted from *São Paulo Medico Yearly* Vol 2 No 2)

This is a very technical paper both in substance and in form.

Of the author's conclusions the three which appear to be of general interest are that there is a direct relation between the toxicity of the venom of *Lachesis lanceolata* and its coagulating power but that there is no relation between its toxicity and its neutralizing power in respect of specific antivenom sera and that antitoxic sera possess a proper "individual action" besides their specific power.

A. A.

PHILALIX. Vaccination contre le venin de vipère et la rage expérimentale par les mélanges virus-venin avec excès de virus. (Vaccination against Viper Venom and Experimental Rabies by Virus-Venom Mixtures.)—*C R Acad Sci* 1928 Nov 26 Vol 187 No 22 pp. 1006-1008.

It is known that animals vaccinated against rabies are refractory to the venom of cobra and viper and vice versa—in other words that the virus and the two venoms all three contain both an antigen for rabies and an antigen for venom. In this paper Madame Philalix gives details of experiments showing that an appropriate mixture of rabies-virus and viper-venom (with the former in excess) inoculated subcutaneously into a rabbit protects the animal both from a lethal dose of viper-venom and from a sublethal dose of fixed virus. The duration of the double immunity thus acquired has not yet been determined precisely but is known to last for several months.

A. A.

KELLAWAY (C. H.). Snakebite and its Treatment.—*Health Bull.* Victoria, Australia 1928 Oct-Dec No 18 pp. 521-525. [Walter & Eliza Hall Inst Melbourne.]

This is a general summary of existing knowledge and more particularly of the recent additions to the local knowledge of the subject made by FAIRLEY and other contributors to the Australian "Symposium" now being noticed in this Bulletin.

NAUCK (Ernst G) Untersuchungen ueber das Gift einer Seeschlange (*Hydruis platurus*) des Pazifischen Ozeans [Observations on the Venom of the Sea-snake *Hydruis platurus*].—*Arch f Schiffs u Trop Hyg* 1929 Mar Vol 33 No 3 pp 167-170 [3 refs] [San Juan de Dios Hosp San José, Costa Rica.]

Confirmatory evidence that the venom of this sea-snake is purely neurotoxic.

A A

REVIEWS AND NOTICES.

VAEGELI (Th) [Prof Dr Bonn.] *A Graphic Guide to Elementary Surgery* Translated by J SNOWMAN M.D., M.R.C.P With Introduction by Dr C GARRE, Bonn.—206 pp. With 322 figs (mostly coloured) 1929 London John Bale Sons & Danceson, Ltd. 83-91 Great Titchfield Street, W 1 [12s. 6d.]

As the author states in his preface this book is an experiment as an introduction to surgery. The book is based on many years personal experience of clinical teaching and follows Garre's methods of tuition. The endeavour is made to enable the student, by means of diagrammatic illustrations, to appreciate better what he sees and hears in his hospital practice. The guiding consideration has been to emphasize the practical aspect of the subject in the "hope that the book may be of some help to the student in appreciating the spirit of surgery and that the impression he will gain from its pages will be a permanent acquisition."

The opening pages are given to anaesthesia, both general and local. The subject is excellently treated, the essential points well brought out, and these few pages carefully read and practised will save the student many an anxious moment.

The following chapters treat of infection, disinfection, haemorrhage, wounds inflammation, injuries, diseases of various tissues, tumours, treatment by operation, grafting, and the last chapter profusely illustrated, is on methods of examination. Some of the illustrations are undoubtedly elementary others minute in detail, in a few the lesson is not quickly grasped. Some discrepancies are present both in text and illustration that should be rectified. Physiological saline quoted as 9 per cent. in the text is rightly shown as 0.9 per cent on the diagram, the use of the fork in Fig. 104 is not explained, and points 1 and 2 referred to in Fig. 37 are not shown. Pronation and supination would be much better illustrated by the fore-arm and hand than by the leg and foot. Trommer's test for sugar is now quite superseded by Fehling's or Benedict's and dilute acetic acid is generally used in testing urine for albumin as shown in the diagram rather than the strong solution as mentioned in the text.

The description of blood transfusion rather ignores the citrate method and gives the impression that the direct method is more frequently used nor is the needle method which avoids exposing the donors' or recipients' veins shown. The formidable array of instruments for vein exposure shown in the illustration has not been found necessary in tropical work. The need of selecting donors free from syphilis or malaria might be stressed.

The statements that "animal parasites are of comparatively small importance in surgery" and that "in certain rare cases elephantiasis is the result of obstruction of the lymphatic vessels by parasites" do not accord with tropical practice. Elephantiasis can hardly be described as rare and the surgery necessitated by the ravages of *F. bancrofti* can be considerable. Hydatid disease and ascariasis as calling for surgical intervention are mentioned, but amoebic abscess of the liver is not noticed.

The author is to be congratulated on providing a clear and concise exposition of the main elementary points of surgery that will help those whose duty it is to teach, and from the pages of which, every careful student is bound to gain some useful permanent acquisition."

A comprehensive index concludes the work.

W. E. Cooke

MAYER (Martin) [Professor Dr. Abteilungsvorsteher am Institut für Schiffs und Tropenkrankheiten Privatdozent an der Universität Hamburg] *Exotische Krankheiten. Ein Lehrbuch für die Praxis.* [Text Book on Exotic Diseases] 2nd Edition.—pp. vii+368. With 252 figs & 3 coloured plates. 1929 Berlin Verlag von Julius Springer [Rm. 39 gebunden Rm. 40 80]

The first edition of Professor Martin Mayer's book was reviewed in these columns in 1924 this new edition is on the same lines as its predecessor but a considerable amount of new matter has been added in spite of this the book is still of a convenient size. Although there is much compression, nothing of any importance seems to have been omitted but it is a book that must be read with concentrated attention, for there is no idle padding.

The author has devoted most of his rather limited space to symptoms and treatment his aim has been to make the book a practical one. The details of zoological descriptions and taxonomy have been omitted deliberately for them Professor Mayer refers the reader to systematic works on these subjects and indeed such lengthy matters are somewhat out of place in a general textbook of tropical medicine.

Some of the articles on tropical diseases of the skin, animal poisons, snakebite and the effects of tropical heat are too summary to be of much use but, with these exceptions, the book is an admirable one. Where all are good, it is difficult to select any particular articles for special commendation, but those on amoebic dysentery abscess of the liver and yellow fever are fine pieces of work. There are many excellent photographs and other illustrations.

To those who read German, and who want a thoroughly reliable book on tropical diseases which will not take up too much space in their libraries this one can be recommended with confidence.

H J Walton

CHAMBERLAIN (Weston P) [Colonel Med. Corps. U.S. Army Chief Health Officer the Panama Canal.] *Twenty-Five Years of American Medical Activity on the Isthmus of Panama 1904-1929. A Triumph of Preventive Medicine.*—74 pp. With 23 plates & 2 maps. 1929 The Panama Canal Press. Mount Hope, C Z

The pioneer in the scheme of constructing a ship canal across the Isthmus of Panama was the great Cortés and as early as 1529 plans for such a project were drawn up. A few years later Charles V of Spain, had further surveys carried out in order to determine the most advantageous course for the proposed canal and the scheme was again revived in 1616 by Phillip II. During the eighteenth century all efforts to commence the undertaking came to nought, and it remained for the closing years of the nineteenth century to call forth the first serious attempt to carry a waterway through the Isthmus. De Lesseps' ill fated project failed, as we know mainly through the ravages of tropical diseases now considered preventable. Between 1881 and 1899 in a force of white employees averaging 1 600 in number there were 2,000 deaths from yellow fever alone while in the whole force with an average strength of 10 000 the total mortality reached the appalling figure of 16 000 in the same period.

In 1904 the United States assumed full jurisdiction over the Canal Zone (a strip approximately five miles broad on each side of the waterway) and, as a necessary part of their health projects they obtained complete sanitary control of the Panaman cities of Panama and Colon adjacent to the extremities of the Canal. The subsequent medical history especially the dramatic conquest of yellow fever is in general well known. Contrary however to what is often stated, there has been no attempt to free the entire

Canal Zone from malaria, a labour that would cost years of effort and millions of dollars. Anti-malaria work is confined to the more important towns and their environs, but even so, this has effected a fall in the malaria incidence rate from 821 per thousand in 1906 to 16 per thousand in 1918, while the death rate has dropped from 7.25 to nil. Since 1918 there has been little further diminution of malaria in spite of an extension of the area under sanitary control. Seemingly the benefits of the new works are offset by the larger number of infections now acquired in non-sanitized districts, for which increased motoring facilities are mainly responsible.

The Health Department under a Chief Health Officer is divided into three sections—Hospitals, Sanitation, and Maritime Quarantine and its present policy is to recruit the staff from the Army Medical Service as far as possible. For several years past the amount voted annually by Congress for the Public Health Service has been \$570 000 to which are added for expenditure the earnings of the Health Department for the year so that the sum available in 1928 was \$1,500 000 of which \$118 000 was spent on strictly anti-mosquito work. It is interesting to note that the famous Panama larvicide has been largely discarded in favour of the cheaper and more effective fuel oil which is preferred also to Paris green. Sanitation may be surprised to hear that the costly modern refuse destructors have been closed, and incineration of garbage replaced by burial, using crude oil to prevent fly breeding. This method of disposal is stated to be more economical and more effective than burning. Stable manure is composted in concrete pits after which it may be employed as fertilizer by permission of the Health Department. The use of fresh manure is forbidden. As a result of these measures the Isthmian towns are so free from flies that traps and poisons are rarely required.

The brochure is well illustrated with photographs and maps, and appended there is a bibliography of medical and allied publications dealing with Panama.

W. P. MacArthur

BUREAU OF HYGIENE AND TROPICAL DISEASES

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MEDICAL ZOOLOGY

METCALF (Maynard M.) *Parasites and the Aid they give in Problems of Taxonomy, Geographical Distribution, and Paleogeography — Smithsonian Miscellaneous Collections* 1929 Feb 28. Vol. 81 No. 8 36 pp. With 4 text figs. [3 pages of refs.]

This interesting paper which every entrant on parasitology should read, explains by abundant illustrations how the parasitologist who takes joy in his work may participate with good effect in those more inspiring branches of natural science that deal with the origin and lineage of species the present and past geographical distribution of animals and plants, and the ever-changing shape of continent and ocean in bygone ages of the Earth.

In his introductory illustration the author shows how from a study of the Opalinid parasites of the rectum of frogs one must infer that the Leptodactyline frogs of S. America and Australia are one kindred, which got its peculiar Opalinids (*Zelleriella*) from a common southern source. In the absence of any existing land connexion between S. America and Australia, one must fall back upon the stretch of land (Antarctica) which is supposed, on good palaeontological evidence, to have connected Patagonia and Australia in the Tertiary period. [The author of course gives the argument in full detail]

A. Alcock.

NAJERA (Luis) *Estadística del laboratorio de la Hipnoseria (Santa Isabel de Fernando Póo)* [Laboratory Statistics of the Santa Isabel Hospital, Fernando Po]—*Medicina Paises Calidos* Madrid. 1929 Mar Vol. 2 No. 2 pp 139-146. With 2 figs.

Of 1,303 patients who continued in hospital for trypanosome infection during the last six months of 1928 590 (45.28 per cent.) showed malaria parasites (not differentiated) 320 also had *F. bancrofti* embryos (not included in the tables) *Loa loa* and *F. perstans* also were met with. Of 566 with trypanosomes 200 (35.33 per cent.) showed both plasmodia (15) and microfilariae (334) only 17 trypanosomes alone. Of 339 with filaria embryos only 295 were *perstans* 15 *Loa loa* and 29 both. Of 340 patients examined, 230 or 67.64 per cent. had hookworms in the faeces. Both *Ancylostoma* and *Necator* were met with, the former predominating, and among them were 156 with *Trichocephalus* 111 with *Ancaris* 19 with amoebae (not identified) and 7 with *Schistosoma mansoni*.

H. Harold Scott.

CURSON (H. H.) *Metazoan Parasites from Zululand*.—*South African J. Natural History* Pretoria. 1928. Apr. Vol. 8. No. 2. pp. 181-187. [3 refs.]

This is a bare list, without any specific descriptions or diagnoses, of 135 species of parasites identified in connexion with studies of nagana by the Veterinary Department of Zululand. The term parasite is here employed in the loosest sense since it includes gadflies and house-flies. The list comprises 17 Tabanidae, 2 Hippoboscidae, 16 Muscidae, 4 Oestridae, 1 Cimex, 6 fleas, 5 Bloodsucking lice, 9 Mallophaga, and 22 ticks—also 2 Trematodes, 6 Cestodes and 45 Nematodes. In the case of the true parasites the names of the respective hosts are appended. [With the exception of the common bed-bug and *Pulex irritans*, no Arthropod parasites of man occur in this list.]

A. A.

FAUST (Ernest Carroll) & KELLOGG (Claude R.). *Parasitic Infections in the Foochow Area, Fukien Province, China*.—*J. Trop. Med. & Hyg.* 1929. Apr. 15. Vol. 32. No. 8. pp. 105-110. [8 refs.]

This survey shows that the amount of infection with intestinal parasites in the Foochow area (Fukien Province, South China) is surprisingly small in comparison with Central and North China. Moreover the intestinal protozoan infections of the various animals that might serve as reservoir or as intermediate host of human infections were not found to be closely related to the human protozoa. The author emphasizes the following facts elicited by the survey:

- (1) The small number of species and low incidence of intestinal protozoa.
- (2) The uniformly heavy infection with ascariis and to a somewhat lesser degree of trichurias.
- (3) The low (subclinical) incidence of hookworm infection in the area, except in the Hak-ha villages near Foochow where a heavy infection of apparently pure *A. diodermis* was encountered.
- (4) The absence of taenias, echinococcosis, hymenolepiis and dipylidiosis in the human population—the occasional presence of *S. mawsoni* in man and the possibility of human infection with the adult *Diphyllobothrium* due to the high infectivity of the intermediate hosts commonly consumed as food without sufficient heating.
- (5) The incidental infection with *S. japonicum* and *F. buski* in the vicinity of Foochow.
- (6) The complete absence of clonorchis infection in man and in dogs and its low percentage of infectivity in cats."

A. A.

FAUST (E. C.) *Report for the Parasitology Diagnostic Laboratory of the Peking Union Medical College Hospital for the Year 1927-1928*.—*China Med. J.* 1928. Nov. Vol. 42. No. 11. pp. 823-828.

— *Human Intestinal Parasites in North China*.—*Am. J. Hyg.* 1929. Mar. Vol. 9. No. 2. pp. 505-508. [Peking Union Med. College, Peking & Dept. of Trop. Med., Tulane Univ. New Orleans.]

This valuable record shows in tabulated form the incidence of intestinal protozoa and helminth infections diagnosed in the parasitology laboratory of the Peking Union Medical College Hospital from October 1st, 1924.

to April 30th, 1928. It is the outcome of 41 742 examinations from 13 617 cases and thus may be regarded as a fair index of the intestinal parasites of North China.

The specific protozoa determined for the whole term of 3½ years, corrected to six examinations and stated as percentage are *Entamoeba histolytica* 20.3 *E. coli* 18.6 *Endolimax nana* 28.0 *Councilmaniana lasfleurs* (?) 7.6 *Iodamoeba butschlii* 6.6 *Dientamoeba fragilis* (2 cases) 0.014 *Trichomonas hominis* 3.54 *Pentatrichomonas*, 0.14 *Chilomastix masnili* 4.7 *Giardia lamblia* 6.7 *Isoospora hominis* (3 cases) 0.022.

The specific helminth infections determined for the whole term and stated as percentage are *Ascaris lumbricoides* 33.4 *Ancylostoma* or *Necator* (1) 5.3 *Trichocephalus trichiurus* 4.7 *Enterobius vermicularis* 0.15 *Trichostrongylus orientalis* 0.029 *Strongyloides stercoralis* 0.037 *Taenia* spp. (intestinal) 0.57 somatic *Cysticercus cellulosae* 0.015 *Echinococcus granulosus* 0.051 *Hymenolepis nana* 0.38 *Hymenolepis diminuta* 0.007 *Clonorchis sinensis* 0.62 (all exogenous) *Schistosoma japonicum* 0.022 *Paragonimus westermani* 0.007 *Fasciolopsis buski* 0.066 (all exogenous).

A careful attempt was made to diagnose *Councilmaniana lasfleurs* by cytoplasmic and nuclear features. Examination of the yearly totals shows a successive decrease in positive findings of *C. lasfleurs*, and a corresponding increase in positive cases of *E. coli*, although the technical staff was essentially the same over the entire period and no one was consciously prejudiced one way or another.

A. A.

DE RIVAS (Damaso) & FIFE (Charles A.) *Intestinal Parasitism in Philadelphia.*—*Jl Amer Med Assoc.* 1929 Feb 23 Vol. 92. No. 8. pp. 624-627 [1 ref.] [Dept. of Parasit. Univ. Pennsylvania.]

The authors realize the value outside the actual tropical environment of the laboratory methods now freely used in the diagnosis of disease in tropical hospitals and countries only, and they here emphasize the general necessity in the diagnosis of gastro-intestinal disorder of a routine investigation of the faeces. Their argument is based chiefly on the information obtained in Philadelphia from their microscopical examination of the faeces of 823 hospital patients of all ages, and 312 other patients. Among the 823 *Giardia* was found in 29 amoebae in 22, *Chilomastix* in 3 and *Trichomonas* in 1 besides a few cases of very common worms. Among the 312, amoebae were found in 63 *Giardia* in 25 *Trichomonas* in 1 *Chilomastix* in 1 and hookworm in 1 besides a few cases of common worms.

A. A.

ANGEL MARÍN (Rafael) *Diarrhea and Enteritis in Porto Rico. IV. Relation to Parasitic Infestations.*—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Nov. Vol. 4. No. 5. pp. 221-228. [8 refs.] [School of Trop. Med. Univ. Porto Rico.]

This is a study of the relation between intestinal parasitism and co-existent diarrhoea and enteritis in Porto Rico where gastro-intestinal maladies contribute so largely to the mortality rate. A hundred and three persons were investigated, of whom 53 were cases of diarrhoea

(mostly chronic) collected from 14 municipalities and in all classes of society and of ages ranging from 3 months to 78 years and 50 were healthy controls being as comprehensively chosen as possible, but quite free from gastro-intestinal trouble. In respect of infestation by animal parasites there was no great difference between the gastro-intestinal cases and the controls, as is shown below. In respect of co-existent diarrhoea and enteritis, in only 7 of the 53 cases could the condition be explained by the presence of an animal parasite. The author's conclusion is that intestinal parasitism (animal) does not explain the high morbidity debited to diarrhoea and enteritis, in Porto Rico.

TABLE SHOWING COMPARATIVE INFESTATION

	Trichuris trichiura	Hookworm	Ascaris lumbricoides	Strongyloides stercoraria	Schistosoma mansoni	Amebæ coli	Infusoria	Entamoeba histolytica	E. dispar	Gardia lamblia	Trichomonas hominis	Giardiasis	Balantidium coli
Diarrhoea group 53 cases	12	7	1	3	4	8	2	5	2	8	2	1	1
Control group 50 cases	14	8	1	1	11	3	7	4	3	1	1	0	0

A. A.

QUERREX (J.) Contribución a la geografía médica del Ferrocarril de Santa Bárbara a El Vigía, en los estados Zulia y Mérida. *Notas preliminares. [Preliminary Notes on the Medical Geography of a Railway in the States of Zulia and Mérida (Caracas).]*—*Gac. Med. de Caracas*. 1928. Apr 30 & May 15. Vol. 35. Nos 8 & 9 pp. 122-126 130-134

Much of this paper consists of general remarks regarding the natural features of the country the climate the heterogeneous inhabitants and their occupations and habits and of detail regarding the sanitary state of the railway. Anopheles and paludism, of course are mentioned, but the points emphasized in the notes on the pathology of the region are enteric fever bacillary dysentery and the remarkable prevalence of intestinal parasites. Hardly a year passes without an epidemic of enteric fever. Of 207 analyses of faeces made in the course of 12 months, 190 were positive for intestinal parasites, multiple infections being common. The parasites (and respective percentages) observed were Trichurias in 85.0 Ascaris lumbricoides in 44.0 Necator in 20.0, "Amoeba dysenterica in 16.0 "Cercomonas in 12.0 Balantidium coli in 10.0 and Taenia and Lamblia each in 1.0

A. A.

BERGMAN (Adolfo) BREYER (A.) & RAGO (L.) Parasitosis intestinal entre los israelitas (aekenasim) en la República Argentina. [Intestinal Parasites among Jews in the Argentine.]—*Arch. Argent. Enferm. Aparato Digest y Nutric.* Buenos Aires. 1929. Vol. 4. No. 3. pp. 417-436. With 31 diagrams.

Of 335 individuals examined 151 (45.07 per cent.) were found infected with parasites of one kind or other. 215 of the total were

women and of them 45.56 per cent. were infected, of 120 men 44.16 per cent. The order of frequency was Blastocystis, 55 per cent of the women, 37 per cent. of the men *E. coli* 17.5 and 22.84 per cent. respectively Trichuris 20 and 37.14 per cent. *Giardia intestinalis* 3.75 and 8.57 per cent. *E. histolytica* 2.5 and 5.7 per cent. The heaviest infection was found in the fifth decade, in Europeans more than Argentines (54.84 to 26.6 per cent.) and generally it was found that the parasitism decreased with length of residence.

H. Harold Scott.

BACCHELLI (Giulio) Il metodo Noguchi Tilden nella fissazione e conservazione dei più vari protozoi ed elminti. [The Noguchi-Tilden Method for fixing and preserving Protozoa and Helminths.]—*Arch Ital Sci Med. Colon* 1927 June. Vol. 8. No 6 pp 330-335 [2 refs] [Inst. of Trop. Path. Univ. Bologna.]

The Noguchi Tilden fluid is composed of N/15 Disodium phosphate 88 parts N/15 Monopotassium phosphate 12 parts To every 9 parts of this is added one part of commercial formalin, immediately before use. For efficient fixation at least 10 minutes exposure is needed.

The author claims that it acts also as a clarifying agent and is good for all protozoa and serves for preserving helminth ova without distortion.

H. Harold Scott.

DE RIVAS (Damaso) Intestinal Parasitism simulating Appendicitis. —*Jl Amer Med. Assoc.* 1929 Apr 6. Vol. 92. No. 14 pp. 1168-1171 With 9 text figs. [3 refs.] [School of Med. Univ. of Pennsylvania, Philadelphia.]

The author considers the facts that various intestinal parasites (both worms and protozoa) may not only originate symptoms resembling those caused by disease of the appendix, but also may be and frequently are, the actual cause of subacute and chronic typhlitis and appendicitis. He therefore lays stress upon the duty of the surgeon, when confronted with all but those acute cases of appendicitis where immediate operation is imperative to examine the faeces to use the proctoscope, and to look for eosinophilia. He quotes Sir Leonard ROGERS remarks on the considerable proportion of chronic dysentery patients invalided from India, who come before the Medical Board of the India Office with a history of appendix removal without lasting benefit.

A. A.

CAMERON (Thomas W M) The Importance of Parasitology in Tropical Lands.—*Vet Rec.* 1929 Apr 13. Vol 9 No 15. pp. 299-301

An address delivered in Trinidad to the local Science Club. It does not contain anything new but is a perspicacious review of the history of modern developments of tropical pathology beginning with MARSHALL'S discovery of the essential part played by the mosquito in the transmission of filariasis.

A. A.

CARTON (F. G.) The Resistance of *Limnaea* to Desiccation.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929 Jan. 30 Vol. 22 No. 4 pp. 335-338. [7 refs.]

The author notes the well known ability of pond-snails to survive the dry or the cold seasons by burying themselves in the mud. In S. Africa *Limnaea* and *Planorbis* appear with the first signs of spring in ponds that had been baked for 2 months and then frozen for several months more. He notes that *Limnaea* prefers light and *Planorbis* darkness. In his desiccation experiments *Planorbis* *spuroboris* holds the record with a resistance of 4 months. In his burial experiments in garden soil *Limnaea natalensis* soon died at a depth of 12 inches, *Physopsis africana* survived at least 12 days at 2 inches, but succumbed after 25 days, *P. pfeifferi* lived at least 30 days at 12 inches, as also did *Bulimus tropicus*. Under natural conditions buried in moist mud, the terms of survival might be longer. But because of this ability to survive deprivation of water the policy of temporarily draining pools in order to destroy pond-snails infected with schistosomes is only of limited value.

In the author's experience dense growth of the water-hyacinth (*Eichhornia crassipes*) by choking and finally expunging collections of stagnant water in the Durban suburbs has been a very evident deterrent to *Physopsis africana* (a common carrier of three Natal schistosomes) and also incidentally to the practice of bathing in infected pools.

A. A.

LIGHT (S. F.) & SANFORD (Mary F.) Experimental Transformation of Termites.—*Univ. California Public Zool.* 1928, July 18, Vol. 21, No. 12 pp. 269-274. With 2 text figs. [3 refs.]

This paper describes the methods by which the experimental study of the protozoan fauna of termites is pursued. In this particular experimental study it is shown that the protozoa of one species of termite can live for at least several months within the gut of a widely different species of termite. [For other references to this fascinating subject—the symbiosis of termites and protozoa—see this *Bulletin* Vol. 21 pp. 159-174-190 Vol. 22 pp. 835-836, and Vol. 23 p. 835.]

A. A.

PAWLOWSEV (E. N.) Die Giftigkeit im Tierreich und die Gift produzierenden Organe. (Venoms and their Organogeny in the Animal Kingdom.)—*Seuchenbekämpfung* Vienna. 1929 Vol. 6 No. 1 pp. 40-48.

This interesting compilation is a sort of subject-index to the large and diversified science of venomous animals and the various modes and manifestations of their peculiar property. In his treatment of a subject that is hard to define comprehensively yet with precision, the author finds it convenient to put venomous animals in two categories according as their venoms are elaborated in definite organs and brought into action by an obvious mechanism or are distributed in some tissue or the blood, where they have to be discovered by experiment and even this artifice has to allow for certain insects that might appear in

both companies. In respect of its contents the paper is a brief epitome of the author's large work *Gifttiere und ihre Giftigkeit* which was reviewed in the *Bulletin* Vol. 24 1927 pp. 327-8

A. A.

NEVEU LEMAIRE (Maurice) & PELLEGRIN (Jacques) *Essai d'ichthyologie médicale. Les poissons hôtes intermédiaires des helminthes parasites de l'homme. [Medical Ichthyology]*—*Ann. Parasit. Humaine et Comparée* 1928. Apr. 1 & July 1 Vol. 6. Nos. 2 & 3 pp. 221-244 343-367 With 18 text figs. [26 refs.] [Parasit. Lab. Faculty of Med. Paris.]

After a brief allusion to fishes that can inflict injury with envenomed spines or with poison fangs or with electric organs and to fishes having poisonous flesh the authors concentrate on the fishes—all Teleostei and chiefly freshwater species—that are the intermediate hosts of helminth parasites of man. Of these intermediate hosts the authors enumerate 57 species distributed in 8 families as follows: Salmonidae 8 species (including the trout, charr and grayling); Esocidae 1 species (the common pike); Gadidae 1 species (the eel pout); Percidae 2 species (the perch and the poise); all of which, except one Japanese Salmonid, are hosts of the plerocercoid larva of the ribbon worm. Cyprinidae 41 species (including carps, barbels, roach, tench, etc.); Osphromenidae 1 species (the paradise fish); Gobiidae 2 species; and Mugilidae 1 species (a grey mullet) almost all of which are hosts of encysted cercariae. The authors write as ichthyologists, giving the characters of the significant families and genera and species of fishes and supplying excellent text figures for the recognition of the genera and species.

A. A.

HOFFMANN (W. H.) & EMBIL (Vicente A.) *Observaciones sobre unos casos de ciguatera. [Some Cases of Ciguatera]*—Reprinted from *Rev. Med. y Ciruj. de la Habana* 1928. Year 33. Vol. 33 No. 18. p. 884

Ciguatera is the name given to the result of poisoning by *Sphyraena plicuda*. Within a few hours, about three as a rule, of ingestion of the fish the following symptoms appear: Abdominal pain, chills, vomiting, diarrhoea, cramps, general depression, pulse small, soft, easily compressible. The post mortem findings in a dog and a cat were a congested gastric mucosa, ulcers in an early stage in the duodenum and jejunum (but *Dipylidium caninum* and *Toxascaris* were present), liver and kidneys swollen, and microscopically the cells were cloudy and there were small interstitial haemorrhages in both organs and intracapsular in the latter. The authors regard the condition as a specific entity quite distinct from ptomaine or leucomaine poisoning.

H. Harold Scott.

GUDGER (E. W.) & BREDER, Jr. (C. M.) *The Barracuda (Sphyraena) Dangerous to Man.*—*Jl. Amer. Med. Assoc.* 1928. June 16 Vol. 90. No. 24 pp. 1938-1943. With 5 text figs. [4 refs.]

The barracudas (Sphyraenidae) are a family of savage and voracious pike-like fishes inhabiting tropical and sub-tropical seas and often

attaining a size large enough to be dangerous. The present paper which is mainly a compilation from the senior author's monograph *Sphyræna Barracoda its Morphology Habits and History* (Publication 252, Papers Department Marine Biology Carnegie Institute of Washington, 1918) contains a most interesting collection of well-authenticated stories of its attacks on man. The authors state that in the Mexican Gulf and Caribbean region the barracoda is regarded as more aggressive than the shark, and they themselves consider it to be of all sea fishes the one most dangerous to man. Wounds made by a barracoda are straight cuts easy to distinguish from the wounds made by the curved jaws of the shark.

A. A.

IMAHARA (Tetsuô) [Ueber den Einfluss einiger Pharmaka auf die tödliche Vergiftung durch Tetrodotoxin.] [On the Influence of Certain Drugs upon Lethal Poisoning by Tetrodon-Toxin].—*Okayama-Igakki Zasshi* (Zent. d. Okayama Med. Gesellschaft) 1928. Dec. Vol. 40. No. 12. pp. 2451-2463. [20 refs.] [In Japanese. German summary p. 2464.] [Pharmacol. Inst., Univ. Okayama.]

[Tetrodon, certain tissues of which are toxic, is a genus of globe-fishes or parrot-fishes.]

The German summary states the results of pharmacological experiments conducted on mice that had received lethal doses of tetrodotoxin, both with drugs having a specific action either on the central or peripheral motor apparatus and with substances like grape-sugar and alkalis that have no specific action and that the following observations were made. Picrotoxin, physostigmin, guanadin and adrenalin augmented the toxic effect. Caffein, hexeton and coramin, and to a less extent cardiazol and grape-sugar prolonged life. Lobelin, and even more effectively carbonate of soda, not only prolonged life further but also reduced the mortality among the mice. The alkali, it is noted, is chemically destructive of the toxin.

A. A.

BUTKA (H. E.) Protozoal Infestations. A Group Study—Some Notes on Stovarsol Treatment.—*California & Western Med.* 1929. Feb. Vol. 30. No. 2. pp. 87-92. [11 refs.]

Many writers, having observed Protozoa in the stools of patients suffering from various symptoms of ill-health are content to assume, without exact inquiry that the Protozoa are the exciting cause of the symptoms and this has led to great argument about it and about, but evermore coming and going by the same door. The present paper is more logical, its author having endeavoured in a group of patients observed under the same conditions, to eliminate the Protozoa by a course of stovarsol and to note any concomitant variations in symptoms.

Of a class of 75 medical students 38 were found to harbour one or more species of protozoa in their stools. (This percentage (50.6) was found to be more than three times as high as the infection observed in a series of hospital patients' stools. In the course of two years, a difference which, as the author may be explained as a temporary result of for } 7) The

protozoa observed were *Entamoeba histolytica*, *E. coli* Councilmanii, *Iodamoeba*, *Endolimax nana* *Chilomastix mesnili* *Giardia* *Trichomonas hominis* and other miscellanea.

Of the 38 infected students 33 appear to have reported 6 of these reported no symptoms the symptoms in the other 27 were diarrhoea 5 constipation 16 mucus in stool 3 blood in stool 1 gaseous distension 33 abdominal discomfort 22, tenderness along colon 9 arthritis 2, neuritis 5 acne 9 eye 9 miscellaneous 15

Of the 33 students having symptoms 30 are stated to have been put under a definite course of treatment with stovarsol—a tablet of 0.25 gm. three times a day for a term of 12 days. The effects of the stovarsol were severe and 14 (?) of them did not complete the treatment but 15 of them went right through with it. Of the 30 treated 10 reported disappearance of symptoms 8 were symptoms improved 9 no change 1 worse (no report 2). Final examinations of stools made from two to eight months after treatment showed that of the 15 students who completed the course only 2 still harboured parasites and of the 14 who did not complete the course 7 still harboured them. Representatives of all the species of protozoa originally observed were found in the resistant stools. This concomitant fall in the number of cases showing abatement and disappearance of intestinal infection and in the number of cases showing abatement and disappearance of symptoms as a result of treatment with a parasiticide drug, is certainly good evidence that chronic infestation by intestinal Protozoa may be pathogenous although in this case it leaves the specific pathogeny undetermined.

A. A.

PHILPOTT (Charles H.) *Effect of Toxins and Venoms upon Protozoa.*—*Proc. Soc. Experim Biol & Med.* 1929 Mar Vol. 26. No 6. pp. 522–523 [2 refs.] [Med. School Washington Univ. St. Louis, Mo & Zool. Lab. Univ. of Missouri, Columbia.]

TUNNICLIFFE'S consideration of *Paramecium* for use in determining the strength of antivenoms has suggested this study to which *Paramecium caudatum* has lent itself well. The minimum dose in 1 cc. of solvent lethal to *P. caudatum* in 24 hours was (a) of rattlesnake (*Crotalus atrox*) venom 0.00002 gm. (b) of mocassin (*Ancistrodon piscivorus*) venom, 0.0000014 gm. and (c) of fer-de-lance (*Lachesis atrox*) venom 0.0000125 gm. Antivenenes neutralize *Crotalus* venom for *Paramecium* so that *Paramecium* can be used in the titration of antivenenes. *Paramecium* can acquire immunity to venom in the usual way in the course of 17 days the animalcules were able to grow in the presence of 3 lethal doses of *Crotalus* venom, but the resistance disappeared after the race grew for 13 days in venom free media. The resistance was specific to *Crotalus* venom

A. A.

KOFOID (Charles Atwood) *The Protozoa of the Human Mouth.*—*Jl Parasit* 1929 Mar Vol. 15 No 3 pp 151–174 [57 refs.]

This is a monographic presidential address on the fauna of a microcosm—the world's wide mouth—a fauna consisting of two species of Protozoa, namely *Entamoeba gingivalis* and *Trichomonas buccalis* both of which have suffered wrong identifications and a plethora of names. Both seem to be very common in men's mouths moreover an amoeba

indistinguishable from *gingivalis* has been discovered by the author in monkeys and *T. buccalis* is common in the dog. Their history, life-history, form and structure and reproduction, and their relation to pyorrhoea are considered in the fullest detail. A bibliography of 57 works by 55 different authors and joint-authors is appended.

A. A.

TALLAFERRO (William H.) *The Immunological Bases for Different Types of Infection by the Blood Protozoa. Chapter XLIX.*—Reprinted from *Amer. Knowledge of Bacteriology & Immunology* pp. 678-701. With 11 text figs. [70 refs.]

This is a résumé of the subject. The author gives first the methods that have been employed for analysing the effects of the host's resistance against the parasite and then outlines the course of certain trypanosome and malaria infections, the effect of the host's resistance upon the particular parasite and the immunological basis for the effects. An ample bibliography is attached.

A. A.

BARROW (John V.) *Intestinal Protozoa. Their Relation to Certain Diseases—Diagnosis and Treatment.*—*California & Western Med.* 1928. Nov. Vol. 29. No. 5. pp. 303-308. [2 refs.]

The originality of this interesting paper is in its argument, not in its facts. The author thinks that—with the distinctive reservations (as we infer from the context rather than are explicitly informed) of *Entamoeba histolytica* and *Balantidium coli*—a heavy and continuous infestation with intestinal protozoa is the origin of a pathological process that is made manifest in the hospital by insidious intestinal disturbance and general malaise—in the laboratory by deficiencies of haemoglobin, red cells, polynuclears, and calcium—and in the region of surmise by a complete lack of vitamins. It is thus the weight and persistence of infestation, rather than any particular protozoan species, that determines the pathogenous process, and the clues to the pathogeny are to be sought in the domain of biochemistry rather than in the popular convocations of protozoology—to wit, in the effects of the absorption of noxious alien proteins. The person heavily infested with intestinal protozoa "is in the same status pathogenically as the carrier of diphtheria, typhoid, tuberculosis, syphilis, gonorrhoea, leprosy" etc. The general treatment should ensure healthy surroundings and nourishing food, and except milk and gruel (with rest in bed) in acute phases, no special diet is necessary. In the medical treatment a reasonable use of ipecacuanha and its derivatives takes the first place and then (in the order stated) stovaineol, neocresophenanthrene, bismuth, (*Chaperro amargosa*, quinine, yatren (anayodin).

A. A.

PETERSON (Dagmar H.) *The Reactions of a Natural Protozoan Community to some Organic Acids.*—*Amer. J. Hyg.* 1923. Sept. Vol. 8. No. 6. pp. 741-758. With 4 text figs. [33 refs.]

The author has experimented with the Infusoria found in the Imhoff tanks of a sewage-disposal plant (*vide* LACKEY Fauna of

Imhoff Tanks New Jersey Agric. Expt. Sta. Bull 1925) In the bacterial fermentations that go on in these tanks acetic butyric, and lactic acids are produced, and the author shows in detail and with precision how certain bacteria multiply in media to which appropriate quantities of these acids are added, and furnish food for the ciliate but apparently not for the flagellate Infusoria

A A

SILBERSTERN (Ernst) Ueber einen Fall von akuter Enteritis mit protozoärer Mischfauna und Vorherrschen von *Limaxamoeba* im Stuhl bilde [A Case of Acute Enteritis with *Endolimax* predominating over other Protozoa in the Stools.]—*Med Klin* 1929 Mar 1 Vol. 25 No 9 (1284) p 348. [3 refs.]

The patient, a young man with a good history on a mid-summer day after a meal of meat and cucumber felt uncomfortable vomited, and had a watery stool. All night long he suffered from bellyache When examined the abdomen was tender and flaccid the transverse colon sensitive and there was gurgling in the iliac region. In the stools were found active forms and cysts of *Endolimax* some flagellates—*Bodo Chilomastix mesnili* and *Trichomonas intestinalis* and some *Spirochaetes* Treatment by restricted diet, animal charcoal, and clysters of $\frac{1}{2}$ per cent solution of tannin. On the 3rd day afterwards no protozoa were found but on the 8th day many *Endolimax* cysts which gradually disappeared after the patient's discharge on the 9th day

A. A.

REGENDANZ (P) & KIKUTH (W) Ueber Aktivierung labiler Infektionen durch Entmilchung (*Piroplasma canis Nuttalli* *brasiliensis Bartonella opossum Spirochaeta didelphydis*) [Activation of Infections by Desmilkation.]—*Arch f Schiff u Trop Hyg* 1928 Dec. Vol. 32 No 12 pp. 587-593 With 5 text figs [14 refs] [Inst. for Ship & Trop Diseases Hamburg]

This is a short review and discussion, with numerous figures illustrating the doctrine that the spleen is an indispensable centre for the production of antibodies in protozoan infections

A. A.

DOBELL (Clifford) Researches on the Intestinal Protozoa of Monkeys and Man. I. General Introduction, and II. Description of the Whole Life-History of *Entamoeba histolytica* in Cultures.—*Parasitology* 1928 Dec. Vol. 20 No 4 pp 357-412. With 2 text figs. & 99 figs on 4 plates [37 refs.] [National Inst. for Med. Research, Hampstead, London.]

After much interesting and relevant proleptic and after describing in detail and in language purged and snuffed from ambiguity the source and history and the necessary manipulations of the several links in the chain of life that sustains the proof that the recorded facts of observation relate exclusively to a pure strain of *Entamoeba histolytica* the author describes his observations of the development of that organism in cultures These observations cannot be better summarized than in his own words

A pure strain of *Entamoeba histolytica* has been isolated and cultivated, and an attempt has been made to study and describe its whole life-history in detail.

"This strain (A. 28 c) was derived from the dysenteric dejects of a kitten experimentally infected *per os* by means of typical cysts from the faeces of a monkey (*Macacus sinicus*). It has now been under continuous cultivation for about 20 months (220 serial subcultures) and its development *in vitro* has been uniform throughout.

"Methods have been devised, and are here described, whereby any desired stage in the life history of this strain—amoebae cysts, and all intermediate stages (including encystation and excystation)—can be readily procured *in vitro* at will.

"Detailed study has shown that the trophic amoebae multiply in culture by simple binary fission only as they do in their natural hosts. Their mode of division is briefly described.

"Encystation also occurs *in vitro* just as it does in the bowel, with formation of characteristic precystic amoebae and the final production of typical quadrinucleate cysts.

"Excystation has been carefully studied, and it has been found that a single quadrinucleate amoeba escapes from each cyst through a minute perforation in its wall. An account is given of this remarkable process, which has not been described previously.

"The 4-nucleate excysted (metacystic) amoeba has been found to produce a new generation of trophic forms by a complicated series of nuclear and cytoplasmic divisions which are described in detail for the first time. The final result of this subdivision is the production of eight uninnucleate amoebulae by each quadrinucleate amoeba hatched from a cyst.

These amoebulae are young trophic amoebae, and not gametes or conjugants. No sexual phenomena of any sort have been observed during the metacystic stages, and the life-history of *E. histolytica*, as visible *in vitro* is thus wholly asexual.

"A development similar to that here described in the case of Strain K. 28 c has been found to occur in many other cultivated strains of *E. histolytica*—including a strain isolated directly from man, and a human strain experimentally implanted in a monkey (*M. sinicus*) and recovered therefrom in pure culture. There are therefore good reasons for concluding that the development here described is not abnormal, and that it is probably closely parallel to that which occurs naturally inside man."

A. A.

REES (Charles) The Infectivity and Pathogenicity of a Starch-fed Strain of *Endamoeba histolytica*.—*Jl. Parasit.* 1923. Dec. Vol. 15 No. 2. pp. 131-134 [7 refs.] [School of Hyg. & Public Health Johns Hopkins Univ., Baltimore Md.]

The author considered the experiments reported by DONALL and LAMBLAW in which *Endamoeba histolytica* cultivated in Boeck and Drbohlav medium that had been enriched with starch failed, when injected *per anum* to induce dysentery in kittens. He also considered the many failures of other workers in this field to infect kittens *per anum* with amoebae from liver-abscess, and he then thought it possible that these failures might be due not to any loss of virulence but to mere sluggishness of amoebae fed on starch or glycogen—by reason of which they were voided from the bowel before they could strike there. He therefore ligated the colon of some kittens and injected his starch cultures of *Endamoeba histolytica* through the bowel wall, so that no escape *per anum* was possible and of 13 kittens so treated 7 became infected, the lesions in some cases being very severe. [The account of the cultures is not entirely clear nor is the method of ligation of the colon or the duration of this obstruction yet described.]

A. A.

JUSTESEN (P Th.) Morphologische waarnemingen aan amoeben van den mensch. [Morphological Observations in Amoebae of Man.]—*Genesisk Tijdschr v Nederl Indis* 1929 Apr 10 Vol 69 No 4 pp 393-396 With 4 plates.

The author found two types of amoebae on the teeth. One practically always present under the gums in cases of pyorrhoea alveolaris has about the size of a leucocyte showing a hyaline peripheral zone round a granulated central part, containing the nucleus which is of the entamoeba type. The amoeba never takes the limax shape and rarely moves to any extent from its place.

The other type is found in the cavities in cases of caries of the teeth, but even more commonly on the roots of extracted teeth (sometimes without any affection of the crown). The author thinks that the amoeba must reach the teeth via the blood current. This type shows all the characteristics of the *Entamoeba histolytica*. The author observed that a part of the amoeba's body is more or less sticky which is apparent from the layer of bacteria and detritus always covering this place. He thinks that this part especially serves for the intake of food as well as for the excretion which latter function he actually observed.

The possible pathogenic significance of these findings is briefly discussed.

W J Bais

ALEXEIEFF (A.) & GWÉLÉSSLANY (J) Sur le mécanisme de la spécificité parasitaire chez les *Trichomonas*. [Mechanism of Parasitic Specificity in *Trichomonas*.]—*CR Soc Biol* 1929 Feb 8 Vol 100 No 5 pp 314-316

A *Trichomonas* (*T. batrachorum*) inhabits the rectum of the edible frog (*Rana esculenta*) and another *Trichomonas* (*T. augusta*) that of the toad (*Bufo vulgaris*) but although in spring time the frog and the toad may be seen in the same pond the *Trichomonas* of the one is never found in the rectum of the other although *Opalina ranarum* and two other Protozoa are found in the rectum of both and the rectal pH is the same in both. Experiments with frogs show that the rectum of the living frog possesses some local defence against the toad trichomonads. For when the toad-trichomonads are injected into the living frog's rectum they disappear in 4 hours and if the injection be again and again repeated (at intervals of several days) they still disappear but if after the injection of the toad trichomonads the frog be killed (by destruction of the central nervous system) and its body kept cool plenty of active toad trichomonads are to be found in its rectum 24-25 hours afterwards. There is some evidence that the local rectal defence is phagocytic.

A. A.

DAVIS (Carl Henry) & COLWELL (Charlotte) *Trichomonas vaginalis* Donné Preliminary Report on an Experimental and Clinical Study—*Jl Amer Med. Assoc.* 1929 Jan 26 Vol 92 No 4 pp. 306-308. [8 refs.]

The authors take a serious view of *Trichomonas vaginalis* as a cause of leucorrhoea. They do not agree with those who to explain its presence in the vagina assume that it is identical with *T. hominis* (=intestinalis) and they could not grow it in a medium well approved

for the latter species. They succeeded, however with Locke's solution containing either 5 per cent. of human blood or (to avoid obstructive blood cells) 5 per cent. of human serum. The best medium, they find, is dextrose broth with 5 per cent. of human serum. In this a heavy growth occurs in 24 hours.

In the treatment of the leucorrhoea, whatever the means used, the entire vaginal mucosa must be reached and the treatment must be persisted in until all the flagellates and all pus and blood have disappeared.

A. A.

YUAK-PO (Li) Culture de *Chilomastix anastomae* [Cultivation of *C. anastomae*].—Ann. Parasit. Humains et Comparés. 1929 Jan. 1. Vol. 7 No. 1 pp. 61-63. With 1 text fig. [3 refs.] (Parasit. Lab. Faculty of Med., Paris.)

Nearly every individual *Anastomum gulo* [a horse-leech] taken in Paris in summer is according to the author infested with *Chilomastix anastomae*, *Trichomonas sanguisuga*, *Entamoeba anastomae* and a Blastocystis. The *Chilomastix* is easily got by washing the rectum with a fine pipette and may be cultivated in Ortolan medium or in a medium containing 1 part of horse-serum and 9 parts of distilled water and 3 gm. per 1 000 of NaCl heated for 15 minutes to 100° C. particularly when the pH = 6.8-7.4 and at a temperature of 20° C. The associated *Entamoeba* and *Trichomonas* multiply along with the *Chilomastix* and the point emphasized is that the two former quickly dispose of any red blood corpuscles that may be added to the medium, while the *Chilomastix* does not.

A. A.

TOULLEC (F) A propos de la lambliose. [Lambliasis].—Bull. Soc. Path. Exot. 1929 Mar 13. Vol. 22 No. 3. pp. 163-165.

The opinion maintained here is that intestinal lambliasis is an "episode" of chronic infection of the gall-bladder. According to this opinion, in one stage of infection the flagellate is localized in the large intestine and causes dysenteric symptoms. In another stage it is localized in the duodenum and causes gastro-intestinal disorder. In a third stage it multiplies in the gall-bladder and causes trouble there and in the liver and this stage being reached the gall-bladder becomes the permanent reservoir whence the flagellate is returned to the duodenum. In discussion DESCHREUX dissented from this opinion.

A. A.

KNOWLES (R) & GUPTA (B. M. Das) A *Tricercomonas* of the Pig.—Indian J. Med. Res. 1929 Jan. Vol. 16. No. 3 pp. 647-652. With 2 plates (1 coloured).

A new species of *Tricercomonas*, *T. swia*, from the pig is described and figured. It is characterized by its relatively enormous size and its sluggish motion. The authors direct attention to it as "a large parasite, easily cultivated, and very suitable for study. A study of it may help to clear up the confusion which at present exists with regard to the genera *Entomonas* and *Tricercomonas*."

A. A.

COVENTRY (Frances A.) Experimental Infections with *Trypanosoma lewisi* in the Guinea Pig.—*Amer J Hyg* 1929 Mar Vol. 9 No 2 pp 247-259 With 3 text figs. [8 refs.] [Dept. of Hyg. & Bact. Univ of Chicago Chicago Ill. & School of Hyg. & Public Health, Johns Hopkins Univ Baltimore Md.]

The course of infection with *Trypanosoma lewisi* in the guineapig was found to be similar to that in the rat except that there was no great increase in the number of trypanosomes during the period of reproductive activity and that adult undividing trypanosomes varied slightly more in size. Attempts to influence the environment favourably by injection of large doses of normal rat-serum into the guineapig had no effect on the course of the infection. Preliminary experiments indicated that splenectomy does not alter the course of infection. Attempts to obtain a more virulent strain by continuous passage through guineapigs were of no avail. Serum from highly and very freshly immunized guineapigs was found to inhibit reproduction of trypanosomes in rats for 4 to 8 days only

A. A.

ROSKIN (G.) & SCHISCHLIAJEWA (S.) Zur Frage des Mechanismus der Kernteilung bei Trypanosomen. [Mechanism of Nucleus-Division in Trypanosomes].—*Arch f Protistenkunde* 1929 Vol 65 No 3 pp 299-305 With 3 text figs [8 refs.] [Microb Research Inst. Education Commissariat R.S.F.S.R. Moscow]

The authors describe and figure the division of the nucleus in *Trypanosoma pecaudi*, *T. suauri* and *T. gambiense* and state that it is identical with that of *T. equiperdum*, *brucei*, *rhodesiense* and *evansi* (described by them, as recorded in this *Bulletin* Vol. 25 pp 725-726)

A. A.

TAYLOR (A. W.) Note on the Occurrence of Crithidia in *Phlebotomus minutus* var *africanus* in Northern Nigeria.—*Ann Trop Med & Parasit.* 1929 Apr 26. Vol. 23 No. 1 pp 33-35 With 1 text fig. [3 refs.]

At Sherifuri during the wet season *Phlebotomus minutus* var *africanus* was daily observed feeding in large numbers exclusively on caged Monitors (*Varanus exanthematicus* and *niloticus*) and a caged python over 99 per cent. of the recognizable blood in their stomachs was reptilian. In 10.2 per cent. of the 304 flies dissected crithidia were present in the mid and hind gut, the heaviest infections 2 or 3 days after feeding and no infections in flies containing fresh blood, or after digestion was complete. From the facts that the Monitors had trypanosomes in their blood and that the trypanosomes known to infect these lizards in Sherifuri is *T. grayi* the author is able to argue that the crithidia in the present case are developmental forms of that species. Since the life cycle of *T. grayi* was observed by LLOYD and JOHNSON *et al* to be continued in *Glossina tachinoides* the author thinks the present intervention of *Phlebotomus* may be accidental.

A. A.

MIRCHELSON (E.) *Bodo urinaris* Künstler Parasit des Menschenharn [*Bodo urinaris* Künstler, Parasite of Urine].—*Cent. f. Bakt. I. Abt. Orig.* 1929 Apr 25 Vol. 111 No. 6-8, pp. 403-406. With 7 text figs. [7 refs.] [Biol. Lab., Univ., Iekutak.]

Description and somewhat diagrammatic figures of this well-known flagellate

A. A.

BRUNDEL (V.) Ueber einen interessanten Flagellatenbefund im Blute der Malaria-kranken. [An Interesting Flagellate in the Blood of Malaria Patients].—*Cent. f. Bakt. I. Abt. Orig.* 1929 Apr 25 Vol. 111 No. 6-8, pp. 406-408. With 4 text figs.

Description, figures, and circumstantial account of a species of *Bodo* observed by the author in about ten instances in thick films of blood of soldiers suffering from benign and sub-tertian malaria. The author explains in detail how all the apparatus of his laboratory in Albania was perfectly trustworthy (absolutely sauber). The films however are said to have been made in the year 1918 and the discovery to have occurred in the examination of "old Albanian material."

A. A.

BARROS (Sebastião) Um caso de coccidiose humana por *Isospora belli* Weyron. [Human Infection with *Isospora belli* Weyron].—*Scientia Med.* 1929, Apr Vol. 7 No. 4 pp. 163-165. With 3 figs. on 1 plate. [2 refs.]

A medical man of 60 years in excellent health suddenly experienced attacks of pain ascribed to biliary colic, and soon after had severe diarrhoea, and the symptoms then disappeared. Ten days later he was again attacked by diarrhoea, with 10-12 motions daily yellow and fatty and the condition was diagnosed as "hepato-pancreatic insufficiency." The faeces contained oocysts of *Isospora belli* in large numbers, but treatment by stomachic, laxative, and measures to correct the glandular insufficiency proved disappointing.

This is the fourth case recorded in Brazil the first by PINTO and PACHECA in 1925 another in 1927 the third by CARINI in 1928. The first and third patients suffered also from amoebic infection.

H. Harold Scott.

FRANCHINI (Giuseppe) Su un caso di coccidiose umana di "*Isospora hominis*," Rivolta. [Case of *I. hominis* Infection in Man].—*Arch. Ital. Sci. Med. Colon.* 1927 June Vol. 8 No. 6, pp. 505-511. With 6 text figs. [9 refs.] [Inst. of Trop. Path., Univ. Bologna.]

The author *inter alia*, describes the present condition, past history and some details of the family history of a young man, who comparatively recently had suffered from amoebic dysentery in whose stools spores of *Isospora biguttata* were found along with active forms and cysts of *Entamoeba histolytica*.

A. A.

TALIAFERRO (Lucy Graves) Return to Normal of the Asexual Cycle in Bird Malaria after Retardation by Low Temperatures *in Vitro*.—*Jl. Preventive Med.* 1928 Nov Vol. 2 No. 6, pp. 525-540. With 8 text figs. [8 refs.] [Dept. Hyg. & Bact. Univ. Chicago.]

Having satisfied herself that the non-sexual cycle of her experimental strain of *Plasmodium cathameris* is a true period, recognizably

constant and individually synchronous almost to the minute the author was able to follow attempts to modify the period experimentally by changes in the environment. She found in drawn blood containing the parasites kept for various terms at 0-5° C. the development of the parasites ceased and that when the blood so treated was lodged in a bird the said period was retarded for a few generations to begin with, but then gradually returned to the norm. To those that believe that the malarial parasites lie dormant during latency the present results would indicate that when the quiescent form initiated a new series of cycles the parasites, no matter when the cycle started within a few generations would be back to normal. To those that believe the parasites continue their asexual cycle throughout latency the present work will be another indication of how difficult it is to alter the asexual cycle.

A. A.

MANWELL (Reginald Dickinson) *Relapse in Bird Malaria.*—*Amer J Hyg* 1929 Mar Vol. 9 No 2 pp. 308-345 With 12 charts in text. [17 refs.] [School of Hyg & Public Health Johns Hopkins Univ Baltimore Md.]

Relapses occur in bird malaria as in man. Relapse in birds has been studied here most thoroughly in chronic infections of *Plasmodium cathemerium* with comparative attention to *P. praecox* *P. inconstans* and the Whitmore strain also. A total of 332 birds was examined, the study being based on thin Giemsa-stained films of blood made from each bird twice a month over a term of 12 months. The following are some of the important conclusions —

There appears to be a seasonal variation in the frequency of relapse the conditions of the environment being on the whole constant. There is evidence of a definite seasonal variation in the proportion of relapses in which gametocytes are noted, the proportion being highest in the fall and winter. The average percentage of gametocytes to non-sexual forms in relapse is so low (about 7 per cent.) in the particular case of *P. cathemerium* that it seems doubtful whether chronic infections of this species are infective to mosquitoes. Immunity as gauged by the frequency of relapse with relation to the time of initial infection is greatest from 3 to 4 months after the original attack, and thereafter becomes less. Quinine and plasmochin given during the acute stage or during the incubation period, probably exercise no influence on the frequency of relapse although there is some indication that after plasmochin treatment, relapses are less frequent for the first few months only to become more numerous later. There is no evidence that the severity of the original infection has anything to do with liability to relapse in the chronic stage. If complete recovery (sterilization) ever occurs naturally it does so very rarely and prolonged absence of parasites from the peripheral blood, by ordinary standards of examination cannot be regarded as an indication of recovery. During 18 months for which records have been kept definite variations have occurred in the mortality rate from acute infections with *P. cathemerium* the peak of the curve being in April. No evidence of parthenogenesis has been observed in the course of this study.

A. A.

BORD (Geo. H.) Induced Variations in the Asexual Cycle of *Plasmodium calhemerium*.—*Amer J Hyg* 1929 Jan. Vol. 9. No. 1. pp 181-187 With 3 text figs. [4 refs.] [Dept. of Zool, Univ Georgia.]

The object of the experiment here recorded was to observe whether the non-sexual cycle of *Plasmodium calhemerium* is subject to influences brought to bear upon the host. Infected canaries were kept in the light of a sunlight lamp during the night, and in darkness during the day. The following is the author's summary of the results —

1. The control birds show the same periodic sporulation as previously recorded by Taliaferro and others, the period of sporulation occurring usually around 6 p. m. daily.

2. Birds which are kept in the light at night and in the darkness during the day have their time of sporulation shifted from the evening hours of corresponding morning hours (sic). Approximately three days are required for this change to take place.

3. When two groups of parasites, one of which is sporulating in the evening while the other is sporulating in the morning, are used for inoculation, a twelve-hour periodicity is not produced. Instead, the same type of infection is produced as when all parasites used for inoculation are of the same age."

A. A.

TALIAFERRO (William H.) Infection and Immunity in Bird Malaria.—*Porto Rico Rev of Public Health & Trop Med* 1928 Oct. Vol. 4. No. 4. pp 155-168. With 4 text figs. [29 refs.]

A generally-instructive survey of the subject given at the local School of Tropical Medicine.

A. A.

HOOVER (Robert) Experimental Studies of Bird Malaria.—*Quarterly Re. Biol* 1929 Mar Vol. 4 No. 1 pp. 59-82. With 13 text figs. [34 refs.] [Johns Hopkins School of Hyg & Public Health, Baltimore Md.]

A good summary of the subject, which everyone may read with edification.

A. A.

MEYER (Hans) Beiträge zur Bartonellenanämie der weissen Ratten [*Bartonella-Anaemia of White Rats*].—*Cent. f. Bak. I. Abt. Orig* 1929 Vol. 110 No. 6-8. pp. 152-158.

These contributions are arranged in 3 sections, only one of which can be brought within the circuit of medical zoology. In this one the author working in Berlin, emphasizes his observation that *Bartonella anaemia fulminans* in desplenated rats at the particular age of three to four weeks. In his experiments *Bartonella* and its associated anaemia occurred in 36 full-grown rats on the 4th day after splenectomy and death followed (5 to 44 days afterwards) in 54 per cent. of cases whereas in 34 young rats, 3 to 4 weeks old, they followed splenectomy in 8 days, and the percentage of fatal cases was 90. Of 11 two-weeks-old rats only 35 per cent. became ill, on the 7th day after splenectomy and only 36 per cent. of these cases ended fatally and of 9 eight-day-old rats (which stood splenectomy well enough) only one developed *Bartonella* and anaemia, and that on the 32nd day.

The second section of the paper discusses successful transmissions of *Bartonella* infection among rats by inoculation of infected liver and heart blood in the third section the prosecution of research by various culture media, for some discoverable contributory factor that may predispose the rat to anaemia is suggested.

A A

PÉRARD (Ch.) Infection du chien par *Bartonella canis* [Infection of Dog by *Bart canis*].—C R Soc Biol 1929 Apr 26 Vol. 100 No 13. pp 1111-1113 [3 refs.]

Experimenting (in the light of the similar experiments made by KIKUTH, which have already been noticed in this *Bulletin*) with dogs that had recovered and were premunized from a prior piroplasmiasis, splenectomy was followed by the appearance of inclusions in the red blood-cells of *Bartonella canis* and subsequently by anaemia. The inclusions showed at different times as small spheres slender straight or curved rodlets granular rodlets (fines granulations accolées) and isolated cocci they seemed to replace one another in the course of the infection and all to be forms of the one species *Bartonella* (or *Grahamella*) *canis*. The infection could not be transmitted to the mouse or be cultivated in media suitable for *Bart muris* but could be transmitted to the rat with difficulty

A. A.

PANAYOTATOU (A) Sur la blastocystose Trois cas d'entérite à *Blastocystis hominis* [Three Cases of *Blastocystis Enteritis*].—Bull Soc Path. Exot 1928 Nov 14 Vol 21 No 9 pp 755-760 [8 refs.]

Here are briefly described three cases—in an old woman and two children—where the prominent symptoms were glairy sanguinolent, sometimes foetid, diarrhoea, and the conspicuous features were emaciation and extreme depression—in which the only organism found in the stools was *Blastocystis hominis*. The drugs that effected cure were variously emetine stovarsol neosalvarsan and yatren. The author concludes that *Blastocystis* is one of the most dangerous causes of tropical dysentery

A. A.

WALL (R E) Review of the Disease Histoplasmosis.—China Med J 1928. Aug Vol 42. No 8. pp 580-581

This is described as a review by a student who prepared and studied some of the infected tissues of a case of histoplasmosis already reported by Drs. WATSON and RILEY of Minnesota University (in the *Archives of Pathology* for January 1926 and in the *American Journal of Tropical Medicine* this *Bulletin* Vol. 24 p 68). The clinical features were a spleen ten times normal size an acute upper respiratory condition, great loss of weight and a temperature not exceeding 102. At autopsy the lungs were diffusely consolidated and showed much fibrosis there was hobnail cirrhosis of the liver and there were large firm lymph nodules along the splenic blood vessels, the aorta, and the common iliac. *Histoplasma capsulatum* was present in enormous numbers in the tissues the author remarks the resistance of the characteristic capsule to stains and quotes the opinion of those who would transfer it from the protozoa to the fungi and place it near the *Cryptococcus* of the epizootic lymphangitis of the horse.

A. A.

WATSON (C. J.) The Pathology of *Histoplasmosis* (Darling) with Special Reference to the Origin of the Phagocytic Cells.—*Folia Haematologica* 1928. Oct. Vol. 37 No. 1 pp. 70-83. With 30 figs. on 5 plates. [67 refs.] [Haematological Lab. & Dept. of Path., Univ. Minnesota, Minneapolis.]

This paper is grounded on a case where Darling's organism (*Histoplasma capsulatum*) was found abundantly in the organs specified below. The patient a female 52, born in Germany resident exclusively in Minneapolis for last 44 years had a history of moderate cough for last 20 years, enlarged spleen for last 8 years and, quite recently of supposed influenza, followed by clinical symptoms of bronchopneumonia and a severe haemorrhage thought to be haemoptysis. Shortly after admission to hospital a large fatal haematemesis occurred. The pathological discoveries were (besides healed apical tuberculosis and unresolved bronchopneumonia) cirrhosis of liver splenomegaly lymphadenopathy (mesenteric, retroperitoneal, mediastinal) aortitis, hydrothorax, and mild nephrosis. The following is the author's own summary:—

"The parasites of *Histoplasmosis* produce a systemic infection in man, the portal of entry probably being through the alveoli or upper respiratory tract. The lesions produced occur in those organs where reticulo-endothelium or accessory tissue (alveolar histiocytes) is present in large amounts. In the present instance the lungs, liver, spleen, lymph nodes, and adrenals showed marked involvement. In the early stage of the disease it is believed that necrosis is prominent shortly followed by phagocytosis, and later by hyalinization and some fibrosis, with the widespread production of local hyaline lesions. *Histoplasmosis* is a non-suppurative disease. The reticulo-endothelial system and its accessory histiocytic elements serve as the chief source of the large number of phagocytes. Lymphocytes supplement this formation by their ability to enlarge and become phagocytic in areas where the parasites are most abundant. This is in accord with the observations of MAXIMOW, DOWNEY, TACHARD, and LARO, and opposed to the views of KYRONO concerning the specificity of vital staining for histiocytes. In the portal areas of the liver there was evidence of transition from fibroblast to phagocyte in some instances. The phagocytes of the lung are largely derived from histiocytes occurring on the alveolar wall. True alveolar epithelium was not distinguished. This is in agreement with the previous reports of LARO and FRIED and contrary to those of FOOT, PEARMAN, or McJUNKINS."

A. A.

BOYCOTT (A. E.) Sensitisation to Insect Bites.—*University College Hosp. Mag.* 1928. Nov. Vol. 13. No. 5 pp. 200-202.

Earlier observations of the phenomena of specific flea-bites led the author to think that the irritating results of the bite of a bloodsucking insect might be explained as an anaphylaxis occurring [? only] after the bitten person had been sensitized to the proteids of the particular species of insect by a previous bite from that species. In ordinary circumstances the argument would be difficult of proof, since it is almost impossible to certify in any particular case whether or not the person under observation had previously been bitten by the particular species of insect. In the observations here described the author set females of a laboratory-bred batch of *Phlebotomus papalei*—*Phlebotomus* being a natural genus that does not occur in the British

fauna—to bite six persons in England, of whom four had never had any chance of being bitten by a *Phlebotomus* and all these four were completely negative at the first biting and all became sensitive and showed violent reactions at the second, or third, or fourth biting from 7 to 13 days after the first. Of the other two persons, one, who had been much exposed to *Phlebotomus* in the East reacted within 5 minutes of the first biting and one who possibly might have been bitten in southern Europe, showed no reaction to the first (and only) biting although the bites flared up 18 days afterwards when the victim had been bitten by some British midges in Dorset. The author explains this last phenomenon alternatively by the assumption that *Phlebotomus* proteid sensitizes man to the proteid of another species of biting fly or by the *périso principalis* that *Phlebotomus* must occur in Dorset. All that the author seems explicitly to claim for his results is that they are in harmony with his idea that a person has to be sensitized before he reacts to the bite of a blood-sucking insect. At the same time he admits that reaction to insect-bites may depend on idiosyncrasy and allows it to be within the bounds of possibility to acquire active immunity to the bites of an insect as the result of frequent suffering from that insect.

A. A.

BORRÉ (E.) *Les moustiques de la Cochinchine et du Sud Annam.* [The Mosquitoes of CochinChina and South Annam.]—*Arch Inst Pasteur d'Indochine* 1928. Oct. No 8. pp. 41-76. With 12 plates.

A continuation including the genera [or subgenera] *Finlaya*, *Aedismorphus* and *Ochlerotatus* of the descriptive catalogue of the mosquitoes of CochinChina and South Annam the earlier instalments of which were noticed in this *Bulletin* ante p 248. The plates portray specific characters of male genitalia and larvae.

A. A.

BEDFORD (G. A. H.) *South African Mosquitoes.*—*13th & 14th Reports Director Vet. Education & Res. Dept. of Agric. Union of S. Africa.* Part II 1928. Oct. pp. 883-990. With 22 text figs. [43 refs.]

This is a good descriptive catalogue of the mosquitoes of South Africa based on a critical survey of the taxonomy of the family and well provided with the synoptical tables that facilitate the identification of genera and species. In the descriptions of individual species attention is paid not only to synonymy and detail of world-distribution but also as far as possible, to local observation of seasonal prevalence habits and breeding places and in the case of the genus *Anopheles* good figures of the wing of each species are added.

A. A.

GATER (B. A. R.) *An Improved Method of Mounting Mosquito Larvae.*—*Bull Entom. Res* 1929 Mar Vol. 19 Pt. 4 pp. 367-368. [5 refs.]

The mounting medium used consists of (in percentage) water 10.0 picked gum arabic, 8.0 chloral hydrate 74.0 glucose syrup 5.0 glacial acetic acid 3.0

The living larva is placed on a slide and all surplus water is removed, some of the medium is dropped on it, and then a coverglass. Clearing begins as soon as the larva is dead (and with most species is complete in 2 hours but with highly pigmented species not until perhaps 24 hours). After mounting, for permanence the preparations are set aside to dry—a process that in a moist atmosphere may take 3 weeks—before being ringed. The advantages claimed for this method are simplicity of technique and efficiency of clearing.

A. A.

WALCH (E. W.) & BONNE WEPSTER (J.). Note sur la conservation des larves des anophèles. (Note on the Preservation of Anopheline Larvae.)—*Rev. de Malariologie*. 1928. Nov.-Dec. Vol. 7 No. 6. pp. 866-887 [English summary p. 817] [Hyg. Lab. Weltevreden.]

— & — A Simple and Reliable Method for mounting Anopheline Larvae.—*Med. Dienst d. Volksgezondheid in Nederl. Ind.* 1929. Vol. 18 No. 1 pp. 111-112. [Med. Lab. Weltevreden.]

— & — Een eenvoudige en goede methode voor het insluiten van larven van Anophelinen.—*Geneesk. Tijdschr. v. Nederl. Ind.* 1929. Feb. 20. Vol. 69 No. 2 pp. 167-168. [Med. Lab. Weltevreden.]

Berlese's liquid is recommended for mounting Anopheline larvae. It consists of Glycerin 40 Hydrate of chloral 100 Pulverized gum arabic 60 Water 100.

The larva is immersed in a drop of the liquid on a slide and covered by a cover slip. In a dry climate the liquid has hardened sufficiently after a few hours to make transport possible otherwise it is necessary (and always advisable) to seal the edges with wax (or a similar substance).

By reduction of water from 100 to 70 the preparation becomes sooner fit for transport even in a wet climate. Larvae preserved in a 4 per cent. solution of formalin may be treated in the same way but the best results are obtained with fresh specimens which are almost as transparent as those mounted in canada balsam.

N. H. Swellengrebel.

RUDOLFS (Willem) & LACKY (James B.). The Composition of Water and Mosquito Breeding.—*Amer. J. Hyg.* 1929. Jan. Vol. 8 No. 1 pp. 160-180. With 8 text figs. [9 refs.] [N. J. Agric. Expt. Station, New Brunswick, N. J.]

This is a very elaborate study but most of its observations and inferences are obvious—as that larvae soon died if the water did not contain enough food—that they soon died also after a rapid change in the reaction of the water but did not seem to be affected by a gradual change in reaction—that the bottoms of different pools differed, and that decaying vegetable debris in different bottoms might variously affect the water in its fitness for the sustenance of micro-organisms for larval food. Other observations are that breeding went on whether bacteria were plentiful or few but not when diatoms, protozoa, and algae were few—that carbon-nitrogen ratios did not seem to affect

breeding and that larvae of one species of *Aedes* (*Ae. canadensis*) were present in water with either high or low total acidity high and low CO_2 high and low chlorides high and low sulphates high and low acid carbonates and free ammonia and albuminoid ammonia.

A. A.

RIGUEAU Les trous de crabes gites à larves. [Burrows of Crabs as Breeding-Places for Mosquito Larvae.]—*Bull. Soc. Path. Exot.* 1929 Mar 13 Vol. 22. No. 3. pp. 175-178. With 1 text fig

In some market-gardens at Dakar the author found *Stegomyia fasciata* breeding in the pockets of water in which the tortuous burrows of the land-crabs terminate. The crabs did not interfere with the larvae. As the natives eat land-crabs the local sanitary authority thought it reasonable to frustrate the mosquitoes by setting the natives to catch the crabs in nocturnal hunts. Having killed off 3 477 crabs many being females carrying eggs the local sanitary authority seems to be satisfied that all is now well. In discussion ROUBAUD mentioned that the land-crabs in question were of the species *Cardiosoma armatum* (Herkl) [*Cardiosoma* is a genus well represented in the West Indies and neighbouring coasts of America, the Cape Verde Islands and west coast of Africa and throughout Indo-Pacific coasts from Madagascar to Peru] ROUBAUD also took occasion to explain that although the introduction of *Stegomyia fasciata* was new to him in this connexion, the fact that a considerable number of species of mosquitoes used land-crabs burrows for their brood was well known and had indeed been brought to official notice in West Africa twenty years ago

A. A.

ROSS (Ronald) Mosquito-Control General or Special?—*Practitioner* 1928 Oct. Vol 121 No 4 (No 724) pp 205-212.

The argument here is that for the control of mosquito-borne disease it is as a general rule simpler and cheaper to include at once all the mosquitoes of the district affected than to confine attention to particular species. General control does not call for the expensive employment of what the author calls a conopsologist [but might better have called a conopologist]

A. A.

LEGENDRE (J) La concurrence entre moustiques zoophiles et anthropophiles. [Competition between Zoophilous and Androphilous Mosquitoes.]—*C R Acad Sci* 1929 Jan. 2. Vol. 188. No 1 pp 95-97 [2 refs]

The author states that he has again been successful in expelling an androphile race of *Culex pipiens* from a troubled locality by the introduction of a batch of larvae and pupae of a zoophile race of the same species. He admits that the process is difficult to explain but is satisfied that the lack of an explanation does not annul the fact "

A. A.

WIGGLESWORTH (A. B.) Delayed Metamorphosis in a Predaceous Mosquito Larva and a Possible Practical Application. [Correspondence].—*Nature* 1929 Jan. 5 Vol. 123 No. 3068 p. 17

This writer having prolonged the term of life of a larva of *Megarrhinus terrapalis* to about five months by keeping it on a reduced diet (and having also incidentally carried it alive from Nigeria to England), thinks that the proposal for introducing *Megarrhinus* into the islands of the Pacific to destroy the filaria-carrying *Anolis variegatus* there, might now be attempted hopefully.

A. A.

ROUBAUD (E.) Cycle autogène d'attente et générations hivernales suractives inapparentes chez le moustique commun, *Culex pipiens* L. [Autogenous Cycle of Winter Generations of *Culex pipiens* L.].—*C. R. Acad. Sci.* 1929 Mar. 4 Vol. 188 No. 10 pp. 735-738 [1 ref.]

The torpor in which the fertilized female gnat (*Culex pipiens*) passes the winter (the male does not usually hibernate) is commonly regarded as being induced by cold—the author endeavours to "explain" it as the result of an "asthenia" peculiar to the female generation hatched in autumn. The author has now discovered in Paris another method by which *Culex pipiens* tides over the winter season.

In a damp cellar containing some water and kept constantly at a temperature above 68° F. he found all through winter small and fragmentary egg-rafts larvae of all stages imagoes escaping from their pupa-case and adult males and females—but never a female holding blood. A study of this phenomenon leads him to conclude that this is what he terms a "suractive thermophile race" of *Culex pipiens* which goes on breeding in rapidly succeeding generations all through winter from November to February the adults without any nutriment but that afforded by moist air. In his own poetic language this thermophile race is adapted not only to triumph over the customary winter asthenia, but also to maintain its *Énergie* *per se* without appeal to any alimentary loan from outside. Males and females can live and breed (see reproduction) without other wants than those of a constant humidity. The winged ones draw from their own organism the needful resources for progeny (ponte) without taking blood or any compensatory organic liquid from outside. When the winter is past the "autogenous" female stock resumes the ordinary blood-sucking habits but has a predilection for the blood of birds.

A. A.

HAMILYX HARRIS (R.) Notes on the Breeding Habits of *Culex fatigans* Wied., and its Associated Mosquitoes in Queensland.—*Proc. Roy. Soc. Queensland* 1928 Nov. 26 Vol. 40 No. 8 pp. 91-103 With 5 figs. on 2 plates. [11 refs.] [Dept. of Health, Brisbane City Council, Brisbane]

This is a long account of extensive and protracted observation of the breeding places of the almost cosmopolitan *Culex fatigans* in the neighbourhood of Brisbane where its larvae are to be found in every sort and kind of water and not always polluted water so that they may occur in company with those of at least nine other species of more discriminative tastes.

A. A.

HARILYN HARRIS (R.) **Notes on the Breeding-Places of *Aedes (Finlaya) notoscriptus* Skuse, in Queensland.**—*Bull Entom Res* 1929 Mar Vol. 19 Pt 4 pp 405-409 [6 refs.] [Entom. Section Dept of Health Brisbane City Council, Queensland.]

Attention is here drawn to *Aedes notoscriptus* which is said to be abundant and semi-domestic in Brisbane. Naturally a tree-hole breeder it is now found breeding not only in bamboos and in the water held by the leaves of the wild pineapple and other plants but also in any sort of vessels containing water especially in cemeteries and particularly about neglected graves. Of 15 644 graves so encumbered examined in one cemetery during the winter of 1927 no less than 7 713 were found to be breeding mosquitoes a large percentage of which were *A. notoscriptus* alone, and a considerable percentage were that species associated with *Culex fatigans*. It appears to prefer alkaline water and it does not shun direct sunlight.

A. A

INGRAM (Alexander) & DE MEILLON (Botha) **A Mosquito Survey of Certain Parts of South Africa, with Special Reference to the Carriers of Malaria and their Control. (Part II)**—*Publications of the S African Inst for Med Res* 1929 Jan. Vol. 4 No 23 pp 83-170 With 26 figs. on 10 plates [20 refs.]

The first part of this excellent report was noticed in this *Bulletin* Vol. 25 p 815. The surveys now reported still deal with High and Low Veld territory in the Eastern and Northern Transvaal. Among species of Anopheles not mentioned before is *A. marshalli* which together with *A. longipalpis* was found not infrequently although both species have been accounted rare in S Africa. The present report confirms the conclusion that *A. gambiae* (= *costalis*) and *A. funestus* are the chief carriers of malaria in S Africa—the former being, perhaps the more dangerous because of its great abundance during the malaria season when the rains are well set. It is less elective in its breeding places being satisfied with puddles and shallow pools exposed to the sun hence its abundance in the rainy season and its practical disappearance during the dry season. *A. funestus* on the other hand chooses for breeding the shady selvedge of sluggish streams and its numbers fluctuate but little throughout the year. In the course of a bad malaria epidemic in the Rustenburg District *A. gambiae* was the only species captured in houses.

The Report includes lists of species of mosquitoes captured or bred from larvae, with local particulars of capture and of provenance of larvae also a list of mosquitoes (8 species of *Aedes* and *Culex pipiens* and *nebulosus*) found breeding in holes in trees also illustrated descriptions of specific larvae and pupae not before described.

A. A

BASU (Bhudeb Chandra) **On the Anopheline Mosquitoes of Hazaribagh (Bihar and Orissa)**—*Indian Med Gaz* 1929 Mar Vol. 64 No 3 pp 141-142. With 2 text figs.

Hazaribagh ('The Thousand Gardens') is a small but locally well-known sanatorium in the hilly district of Chutla Nagpur in the

province of Bihar and Orissa. It has a "lake," and there is also a swamp. It now appears that no less than eleven species of *Anopheles*—including such dangerous species as *histoni* and *cuficifacies*—breed in these waters, and that Hazaribagh is becoming more and more malarious. (Chutla Nagpur is one of the districts that from of old has supplied the Assam tea-plantations with labour and the time-expired coolies invariably return home with a heavy malarial infection). As the author says, Hazaribagh [which fifty years ago as the reviewer knows had an honoured name] should not be allowed to become a name of terror and out of this present investigation, which was made during a holiday he calls for a detailed mosquito and malaria survey.

A. A.

MACARTHUR (W. P.) *The Adult Mosquitoes of Shanghai*.—*Jl Rm Army Med Corps* 1929 Apr Vol. 52. No. 4 pp. 241-27 [4 refs.]

This paper includes a most interesting account of *Anopheles kiyusui* (= *sinensis*) the only species of *Anopheles* discovered in Shanghai by the author's careful search in the summer of 1897. Contrary to the settled beliefs of the local profession—beliefs based upon the traditional exemption of the European community from malaria—this common local species was proved by experimentation with an Indian soldier suffering from a convenient relapse to be an efficient carrier of the infection a discovery that afterwards led to the detection of 200 cases of probable malaria of indigenous origin among the population of the native quarter. The exemption of the European community appears to be due to the accident that the insect has a rooted dislike to large airy well-lighted rooms. *Anopheles kiyusui* was not only found in the town and in the outskirts of the Settlement, but also was constantly observed in swarms at Hung Jao about five miles distant where large numbers took free advantage of the men's tents of the British Defence Force though only 2 individual specimens were seen in the course of 10 days in the house used as the officers mess. The British detachment at Hung Jao was therefore sent back to Shanghai but of the men composing it some 100 subsequently developed malaria.

The other species represented in the collection made at Shanghai in 1927 are *Culex mimeticus* *C. bitarsiorhynchus* *C. tritarsiorhynchus* *C. fuscicollis* *C. pipiens* *C. fatigans* *Lutzia fuscans* *Aedes* (*Stegomyia*) *albopictus* *Ae.* (*S.*) *chenuiporcensis* and *Armigeres obsoletus*.

A. A.

BOYD (Mark F.) *Studies on the Bionomics of North American Anophelines. Physical and Chemical Factors in their Relation to the Distribution of Larvae in Northeastern North Carolina*.—*Jl Hyg* 1929 Mar Vol. 9 No. 2 pp. 346-370 With 6 charts & 1 fig. [3 refs.] [Station for Field Studies in Malaria, Edenton, North Carolina.]

These studies relate to three common North American species of *Anopheles*, namely *A. quadrimaculatus* *A. crucians* and *A. punctipennis*, and the facts of general interest disclosed indicate that among the

circumstances determining the distribution of these species the temperature and reaction of the water and its tension of O and CO_2 are highly important. Breeding was never observed in waters entirely destitute of O . *A. quadrimaculatus* appeared in like waters with a fairly high CO_2 tension. It and *punctipennis* favoured either an alkaline or a neutral reaction. *crucians* a reaction either neutral or acid. How these factors operate is not yet discussed, but the author is not satisfied that their influence is not exclusively upon the plancton.

A. A.

WEBSTER (W. J.) A Note on the Anophelines found in Baroda Camp
—*Indian Med Gaz* 1929 Apr Vol. 64 No 4 pp. 197-198 [4 refs.]

In the course of a regular watch continued during the whole of the year 1927 the following eight species of Anopheles were observed in the square mile occupied by Baroda Camp (in the Gujerat Division of the Bombay Presidency) *A. subpictus* *A. culicifacies* *A. stephensi* *A. fuliginosus* *A. theobaldi* *A. jeyporensis* *A. funestus* and *A. maculipalpis*. No 1 was the commonest and bred freely in stagnant pools and in any sort of thing holding water. No 2 3 5 7 8 were caught in bungalows. No 2 in the later months and in large numbers. No 3 occasionally and throughout the year. No 5 occasionally. No 7 and No 8 once.

A. A.

REITLER (R.) & SALITERNIK (H.) Ueber Anophelenwanderung
[Migration of Anopheles.]—*Arch f Schiffs u Trop Hyg* 1929 Mar Vol. 33 No. 3 pp 170-181 With 3 text figs. [4 refs.]
[Dept. of Hyg. Hebrew Univ. Jerusalem.]

The following is a translation of the authors' summary of this paper. In the region of Lake Tiberias there occurs a form of migration that hitherto has not been observed of Anopheles elsewhere. It consists in a tendency of the wintering generation to drift in mass to distances—up to 12 kilometres—far beyond their normal range of flight. In this drift malaria infected individuals take part and to such an extent as to convert a highly malarious district into one with little malaria.

A. A.

KUMM (Henry W.) Studies in the Dispersion of Anopheles Mosquitoes.
—*Amer J Trop Med.* 1929 Jan. Vol. 9 No 1 pp. 67-77 With 1 map [5 refs.] [Station for Field Studies in Malaria, Edenton, North Carolina.]

These experiments were made in North Carolina, in a fertile district abounding in natural waters and also liable to inundations and inhabited by negroes living in dirty and dilapidated cabins. Most of the mosquitoes captured and liberated were *Anopheles quadrimaculatus*. Of 616 stained insects liberated 37 per cent. were recaptured, only 1.9 per cent. in the place where they had been set free. The longest flight observed was 0.4 mile. The longest interval between liberation and recapture was 9 days.

A. A.

SMORODINKEV (I. A.) STENZOV (B. M.) & ADOWA (A. N.). Les variations de la réaction réelle de réservoirs d'eau artificiels dans les recherches sur la biologie des anophèles. [Variations of Reaction of Artificial Collections of Water and the Biology of Anophèles.]—C. R. Soc. Biol. 1928. Dec. 14 Vol. 99 No. 36 pp. 1763-1766. [4 refs.] [Trop. Inst. Moscow]

In earlier papers (see this *Bulletin* Vol. 24 p. 883 and Vol. 25, pp. 815-816) the authors recorded their observations of Anophèles larvae in marshes in the vicinity of Moscow showing that the acid waters of bogmossy (*Sphagnum*) marshes poor in calcium and rich in iron were noxious to those larvae and that the alkaline waters of sedge (*Carex*) marshes were propitious. They now report some results of laboratory experiments designed to ascertain to what extent the reaction and chemical composition of the water are responsible influences. In these experiments artificial water strongly acidified with SO_4 of pH 2.43 to 2.71 and water strongly charged with iron of pH 2.63 to 2.81 were as noxious as natural *Sphagnum* water (of pH 3.08 to 3.44) young larvae dying in 2 to 3 days after introduction. On the other hand the artificial waters most favourable for the young larvae were that of pH 5.91 to 6.26, containing a double proportion of calcium that of pH 5.82 to 6.24 in which calcium was much reduced chlorine being absent and a third water of which the only differential character seems to be a pH 6.73. Natural *Carex* water pH 5.75 to 6.70 in the laboratory was, contrary to expectation not very favourable to the larvae. In all the experiments the several artificial waters differed in one variable the tension in Na, K, Mg, Al and Si being the same in all.

A. A.

SOESILO (R.). De experimenteele ontvankelijkheid van *Mys. rossii* voor malaria infectie. [Receptivity of *Mys. rossii* for Malaria Infection in Laboratory Experiments.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68. No. 5. pp. 725-731. [10 refs.]

The author infected with *Pl. falciparum* and from the same four patients, (a) 75 *Anopheles subpictus* of Grassl (=rossii) bred from brackish, and (b) 15 bred from fresh-water larvae and also (c) 32 *A. ludlowi* of Theobald. (All four carriers were being treated—3 with quinine 1 with plasmochin). Of lot (a) 65 showed infection (29 salivary) of lot (b) all 15 (3 salivary) and of lot (c) 28 (9 salivary)—almost the same rate of infection for all three forms.

N. H. Swellengrebel.

BAUG (S. L.). Aanteekeningen omtrent Moskiten (IV). [Notes on Mosquitoes.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68. No. 7. pp. 821-826. With 9 figs. on 3 plates. English summary pp. 828-827. [7 refs.] [Med. Lab. Weltevreden.]

Description of a new species of Anophèles of the subgenus *Hironella* from the Moluccas, *A. (H.) brevistylus* in both sexes of which the palpi are very short (about one-fourth the length of the proboscis) and the antennae merely pilose. A larva much resembling that of *A. (H.) brevistylus* is tentatively associated with this species.

A. A.

DANILOW (B. A.) Des observations à propos de l'hivernage des imagoes des cousins dans la vieille ville de Tachkent et ses environs. [Hibernation of Mosquitoes in Tashkent.]—*Revue Méd d'Usbekistan* Tashkent, 1928. Oct. No 1 French summary p 101 [In Russian pp 51-60 29 refs.]

In Tashkent the common *Anopheles* is *A. maculipennis* var *sacharovi* which hibernates in houses and warehouses. *A. superpictus* and *A. byrcanus* are rare

A. A.

DUREN (A. N.) Contribution à l'étude des culicidés du Congo Belge Province du Congo-Kasai [Study of Culicidae of Belgian Congo.]—*Ann Soc Belge de Méd Trop* 1929 Mar 31 Vol. 9 No 1 pp 97-115 [8 refs.]

A catalogue of the Mosquitoes of Leopoldville and Boma with particular reference to the breeding places and domiciliary habits of individual species.

A. A.

MATHESON (Robert) & HENMAN (E. H.) The Vermillion Spotted Newt (*Desmognathus viridescens rafinesquii*) as an Agent in Mosquito Control.—*Amer J Hyg* 1929 Jan. Vol. 9 No 1 pp 188-191 [3 refs.] [Dept. of Entomol. Cornell Univ Ithaca, N.Y.]

In Ithaca (New York) the authors noticed the results of obvious decimations of mosquito larvae in woodland pools and at last they suspected the vermilion-spotted newt. This suspicion they have confirmed from the newts' stomachs and by feeding experiments.

[It must be remembered that newts are restricted to the Northern Temperate Region.]

A. A.

MANDOUL. La lutte contre les moustiques les mouches et les rats. [The Battle against Mosquitoes, Flies and Rats.]—*Jl Méd de Bordeaux* 1929 Mar 10 Vol. 106 No 7 pp 200-206.

This is a good compilation dealing with general principles and methods rather than with practical details of application.

A. A.

LAGERON (Maurice) Mycose d'une larve de *Culex hortensis* de Corse. [Mycosis in a Larva of *Culex hortensis* in Corsica.]—*Ann. Parasit Humains et Comparés* 1929 Mar 1 Vol. 7 No 2. pp 107-111 With 3 text figs. [8 refs.] [Parasit Lab Faculty of Med. Paris]

Study of a fungus growth found embracing a segment of the intestine and penetrating the trachea of a larva of *Culex hortensis* well illustrated and documented.

A. A.

SICÉ (A.) & VAUCÉL (M.) Etude des gîtes à larves de moustiques à Brazzaville Présence du *Stegomyia fasciata*. —[Breeding Places of *Stegomyia fasciata* in Brazzaville.]—*Bull Soc Path Exot* 1928. Nov 14 Vol. 21 No 9 pp 768-770 [Pasteur Inst. Brazzaville.]

The outbreak of yellow fever at Matadi in 1927 has induced these observers to make it known that *Stegomyia fasciata* is abundant in Brazzaville [about 150 miles further up the Congo], and that most of its numerous breeding places are in the European quarter

A. A.

MATHUS (D.) Biologie d'un moustique côtier du var *Aedes desbousi* Seguy 1923. [Biology of *Ae. desbousi* a Coastal Mosquito.]—*Bull. Soc. Path. Exot.* 1929 Mar 13 Vol. 22. No. 3. pp. 170-182. [1 ref.]

The author relates how he was able to breed this mosquito—which he found in nature breeding in rock pools filled by the sea—in fresh water but not in water of greater saltiness than seawater (e.g., of 100 gm. of salt to the litre).

A. A.

SMORODINZEW (I. A.) & ADOWA (A. N.) Variations de la conductibilité électrique des eaux de réservoirs artificiels dans l'étude de l'écologie des larves d'anophèles. [On Variations of Electric Conductivity in Artificial Waters in the Study of the Oecology of Anopheles Larvae.]—*C. R. Soc. Biol.* 1929 Jan. 18. Vol. 100 No. 2. pp. 88-89. [1 ref.] [Trop. Inst., Moscow]

This instalment of the study of the oecology of *Anopheles* larvae deals with the approximate estimation of changes that occur in the mineral ions in artificial waters.

A. A.

ADOWA (A. N.) & SMIRNOWA (A. M.) Sur les variations du degré d'oxydation dans les réservoirs d'eau artificielle dans l'étude de l'écologie des anophèles. [On Variations of Oxygen in Artificial Waters in the Study of the Ecology of Anopheles.]—*C. R. Soc. Biol.* 1929 Apr 18. Vol. 100. No. 12. pp. 998-1000. [2 refs.] [Trop. Inst., Moscow]

This instalment of the study of particular factors in the environment of *Anopheles* larvae deals with differences of oxygen value (as indicated by activity of accretion of organic matter) in artificial waters. Even boggy waters, though far inferior to sedge waters in this evidence of oxidation, are sufficient for the study of the oecology of *Anopheles*.

A. A.

ACHUNDOW (Ismail) Ein weiterer Beitrag zum Rassenproblem der Anophelen. [A Further Observation on the Anopheles Race Question.]—*Arch. f. Schiff- u. Trop. Hyg.* 1929 Apr Vol. 33. No. 4. pp. 215-219. [3 refs.] [Inst. for Ship & Trop. Diseases, Hamburg]

This is a paper of an interest purely biological, dealing with the influence exercised by the colour of the vessels in which *Anopheles maculipennis* larvae were raised upon the larva itself, the pupa, and the imago. It cannot be summarized with lucid brevity.

A. A.

HUTTENAX (R. G. J. F.) Malaria en Anophelinen in het bergland van Ceram. Malaria and Anophelines in the Hills of the Island Ceram (Malacca).—*Geneesk. Tijdschr. v. Nederl. Indië* 1929 Apr 10. Vol. 69 No. 4. pp. 369-376. With 1 plate & 1 folding map. [3 refs.]

In the hilly country (300-1,800 ft.) the malaria spleen rate varies from 14-70 per cent. *A. punctulatus* Dö., the most common species, is considered the principal carrier. Other species are *A. barbirostris* v. d. W. var. *pallidus* Sw., *A. sinensis* James var. *insularis* f. *flavus* Sw. and (at the coast, near Pura) *Blomella gracilis* Theob.

N. H. Swellengrebel.

- RICKARD (E. R.) Estudios sobre el alcance del vuelo del *Anopheles pseudopunctipennis* en el norte argentino [The Range of Flight of *Anopheles pseudopunctipennis*].—*Semana Méd* 1929 Apr 11 Vol. 36 No 15 (1839) pp 899-906 With 3 figs & 1 map [5 refs]

The author has discovered the average flight of *Anopheles pseudopunctipennis*—chief some say the only malaria-carrier in N Argentina—to be 4 to 6 miles despite natural impediments and he therefore indicates the necessity of wide protective (antilarval) belts. H Harold Scott.

- GONTSCHAROW (G D) [Nutrition des larves d *Anopheles maculipennis* dans les conditions artificielles] [Nutrition of Larvae of *A maculipennis*].—*Russian Jl Trop Med* 1928 Vol. 6 No 8. pp 482-487 With 2 text figs. [6 refs.] [In Russian. French summary p 488.]

The conclusions quoted in the summary are that the larvae of *Anopheles maculipennis* are omnivorous (upon the plancton) and that it seems that a rich plancton may compensate for poverty of calcium in the water

A. A.

- VAN THIEL (P H) La nourriture des larves de l *Anopheles maculipennis* en rapport avec le problème de l existence de la variété *atroparvus* [The Larval Pabulum in Relation to the *Atroparvus* Variety of *Anopheles maculipennis*].—*Bull Soc Path Exot* 1928. July 11 Oct. 10 & Nov 14 Vol 21 Nos. 7 8 & 9 pp 551-574 637-683 797-807 [41 refs.] [Inst. of Trop Med Leyden.]

Van Thiel returns again to his small, dark, *atroparvus* variety of *Anopheles maculipennis* the origin of which he attributed chiefly to the modified pabulum of a particular larval environment [see this *Bulletin* Vol. 23, p 712 Vol 24 p 883 and Vol 25 p 821] As he now finds that the small variety retains 'en grande partie' its constancy when bred under observation in the same circumstances as the typical large form he is confirmed in his opinion that it is an established genetic race, although he now thinks that its origination was not entirely due to a modified pabulum in the larva stage

A. A.

- IYENGAR (M. O T) Comparative Study of the Larvae of *Anopheles fuliginosus pallidus* and *philippinensis*.—*Indian Jl Med Res* 1929 Jan. Vol. 16 No 3 pp 639-645 With 4 plates [3 refs]

According to the author *Anopheles pallidus* of Theobald and *A philippinensis* of Ludlow although having a wide range in Bengal have been generally mistaken for *A fuliginosus* of Giles which they resemble very closely In these seven pages he describes and compares the larvae of the three species and also illustrates their differences *inter se* in four plates of microphotographs.

A. A.

- SINTON (J A.) Notes on some Indian Species of the Genus *Phlebotomus* Part XXIV *Phlebotomus barraudi* n. sp.—*Indian Jl Med Res* 1929 Jan. Vol. 16 No 3 pp 716-724 With 2 plates [3 refs]

This new species *Phlebotomus barraudi* came from Assam and had been determined as a variety of *P minutus* until it was discovered that its buccal armature differed from that of any other species described from India. The detailed descriptions of both sexes are furnished with differential diagnoses and are further elucidated by figures of characteristic points of structure.

A. A.

MAONITSEY (W. J.) & GUTERWITZ (A. W.). Zur Frage über die Veränderlichkeit einiger systematischer Merkmale der Arten der Gattung *Phlebotomus* [Variability of some Systematic Characters of some Species of *Phlebotomus*.]—*Crust. f. Bak.* I. Abt. Orig. 1929. Jan. II. Vol. 110 No. 4-5. pp. 199-208.

The authors find much variation in certain characters (of the antenna, palp, and wing) that are commonly assumed to have definite and distinct standards of constancy for the different species of *Phlebotomus*. They find that these characters not only may vary within the limits of the specific standard but also may differ on opposite sides of an individual fly and they conclude that for females of the genus a rational method of classification is still to seek. The paper consists of minute detail and figures of measurements.

A. A.

MYERS (J. G.). Further Notes on *Alysia manducator* and other Parasites (Hym.) of Muscoid Flies.—*Bull. Entom. Res.* 1929 Mar. Vol. 19 Pt. 4. pp. 357-360.

From these miscellaneous notes on Hymenopterous parasites of Muscoid maggots the following observations are taken. (1) In exposed carcasses (e.g. cats) the author has noticed a (potential) definite succession of different species of necrophagous maggots appearing with the advance of putrefaction, the succession being actually determined in the first obvious instance by weather. Thus with a fresh carcase and fine weather *Lucilia* and *Calliphora* took possession but it often happened that when *Lucilia* and *Calliphora* were hindered by rain and cold, and the carcase became stale then either *Hydrotaea dentipes* obtained a start, and its predatory maggots ousted all other Muscoid larvae or forms like *Musca stabulans*, *M. palustris*, *Ophirosia anthracis* and *Prophila nigricaps* exploited the carcase. These observations, as the author points out, suggest that particular species of flies are attracted by particular products of the gradual processes of decomposition—not simply by the gross stink. (2) The Braconid parasite *Alysia manducator* is not so eclectic as has been supposed. In England it is almost restricted to maggots of *Calliphora erythrocephala* and some species of *Lucilia*. In Australia and New Zealand it is now known to attack *Chrysomya albiceps* also. An obstacle to its establishment in Australia is the presence of the very generally destructive pupa hyperparasite *Mormonella viripennis*. (3) The Ichneumonid parasite *Atractodes grandis* appears to be a specific parasite of *Hydrotaea dentipes*. (4) The Cynipid *Figulus striolatus* was bred abundantly from the pupae of *H. dentipes*.

A. A.

- L. COUSIN (G.). Sur les relations entre l'accouplement et le réflexe de ponte de *Lucilia sericata* Meig. [Relation between Coupling and Oviposition in *Lucilia sericata* Meig.]—*C. R. Soc. Biol.* 1929. Apr. B. Vol. 100 No. 11 pp. 818-820 [2 refs.]
- II. — Sur les conditions extérieures déterminant le lieu de ponte de *Lucilia sericata* Meig. [Conditions determining Place of Oviposition of *Lucilia sericata* Meig.]—*Ibid.* pp. 820-822. [2 refs.] [The Sorbonne Paris.]

I. In rearing the blowfly *Lucilia sericata* the author sometimes gets batches of eggs that do not hatch. To clear up the matter he kept

under daily observation a lot of 100 virgins of this species, carefully isolated in maiden meditation from the moment of their eclosion, but well fed, and he found that the maturation and the periodic delivery of eggs—3 or 4 batches each of two to three hundred eggs—during a term of a month or so occurred with them almost exactly as in the ordinary fertilized female some irregularity in the intervals between delivery of batches and in the number of eggs in the batch and some increase in the length of virgin life, are the only noteworthy deviations from the normal. The virgin eggs which were quite normal in appearance did not develop nor could development be excited by the usual artificial stimuli—mechanical, physical, or chemical. Thus the series of autogenous phenomena that culminates in the periodic delivery of eggs termed by the author a reflex, is independent of the act of fecundation.

11. The author has observed the deposition of eggs of *Lucilia sericata* in nature—in a batch the individual eggs coherent in the long axis in serried superposed ranks the lowest rank adherent to the substratum, which is either the carcase of an animal or the excrement of a non-herbivorous animal but he questions whether the character of the substrate is to be interpreted as the manifestation of an instinct working for the benefit of the larva and the conservation of the species. He therefore examines the matter in his laboratory where he finds that if *Lucilia* be fed exclusively on meat she deposits her eggs on meat thrusting them well in sometimes even into fragments of meat but if she be allowed a varied diet of meat and sweets and fruit she does not (as she should were she compelled by an instinct awakened by the sense of smell) deposit her eggs always on the meat but very often on the fruit or on apple jam, where the larvae that issue soon die if they are not removed to a meaty pabulum. Whether it be on meat or on fruit the eggs are deposited in the same mechanical way the female touches the surface with the tip of her abdomen inserts her ovipositor and retires after emitting her eggs. The author therefore concludes that the act of delivery is a reflex action—a simple physiological reflex—the afferent impulse resulting from the contact of the tip of the abdomen with the organic substratum

A. A.

DAVIES (W Maldwyn) *Hibernation of Lucilia sericata* Mg [Correspondence.]—*Nature* 1929 May 18. Vol. 123. No 3107 pp 759-760

The author in N Wales observed that between May and September larvae of *Lucilia sericata* brought to his laboratory direct from infested sheep completed their metamorphoses fairly constantly on the average in 21 days. From September 8th, however they did not proceed even to the stage of pupation. On October 15th six batches each of 120 larvae were placed on as many earthen pots 5 inches deep filled with various kinds of soil, three of the pots being buried to the rim out of doors, and three kept in the laboratory and all being covered with muslin. In about 15 minutes the larvae had burrowed out of sight. Throughout the winter until March 20th to 26th they remained deep buried in the earth, dormant the minimum air temperature (February 14th) just above the out-door pots being 16° F and the soil then completely frozen. Between March 20th to 26th (mean daily temperature

53-8° F) the larvae began to make their way towards the surface, ultimately coming to rest within quarter of an inch of it. Between April 2nd and 10th the majority had pupated. The first fly emerged on April 27th outdoors and April 10th indoors. Humidity was maintained by daily watering of the pots. The author notes that *Lucilia sericata* is known to winter in the larva and pupa stages, in the U.S.A.

A. A.

STEWART (M. A.) A Case of Dermal Myiasis caused by *Phormia regina* Meig.—*Jl. Amer. Med. Assoc.* 1929 Mar 9 Vol. 92 No. 10 pp. 788-799 With 3 text figs.

A young negroess of the unfortunate sisterhood, admitted for an abscess and septic inflammation of the scalp. A purifying, but exceedingly painful, sulphur lotion aroused a swarm of maggots, which were picked away as they attempted to escape. Some that were caught and kept alive to the final metamorphosis were identified as *Phormia regina*. The author gives a description of the fly and its habits and describes and figures the larva and its posterior spiracles.

A. A.

BOUFFARD (G.) & LEGAC (P.) Myiasis à *Chrysomya bezziana* [nd] observée chez un indigène de la Côte d'Ivoire. [*Chrysomya bezziana* Myiasis in a Native of the Ivory Coast.]—*Bull. Soc. Path. Exot.* 1928 Jan. 9 Vol. 22 No. 1 pp. 45-49

In this case 163 maggots of *Chrysomya bezziana* were removed from a tumour of the chin from which the usual foetid sanious exudation issued. The patient was a thief, who after being caught, *flagrant crimine* and badly beaten, fell into a sleep of exhaustion in the jungle [when and where one of his wounds got fly-blown.]

A. A.

LIMA (J. B. SOUZA) Considerações em torno de um caso de berne palpebral. [A Case of Palpebral Myiasis.]—*Brasil-Médico* 1929 May 25 Vol. 43 No. 21 pp. 601-603.

A child, 28 days old with the right lower eyelid much inflamed, resembling a furuncle pointing on the conjunctival surface, due to the larva of *Dermatobia cyaniventris*.

H. Harold Scott.

KARIBOW (N.) [Ein Apparat zur gewaltsamen Fütterung der Stechmücken.] [Apparatus for Forceful Feeding of Bloodsucking Flies.]—*Nachrichten d. Tropischen Medizin.* Tiflis. 1928. Nov. Vol. 1 No. 1 [In Georgian script. German summary p. 114]

The apparatus consists of a glass tube with one end drawn out into a capillary and the other end fitted with a piston. When the fly to be fed is in the tube the piston is inserted and the fly driven down and manipulated until its proboscis is in the capillary attenuation, the end of which is now placed in a drop of blood. The blood can be seen to mount by capillary attraction and in time to be absorbed by the fly.

A. A.

SIMMONS (R. J.) Notes on a Tsetse Belt in Western Uganda.—*Bull Entom Res* 1929 Mar Vol 19 Pt 4 pp 421-433. With 1 text fig 2 plates & 1 map

This is the history of a local invasion by *Glossina morsitans* and of its fluctuating progress over about a thousand square miles of country in the course of 21 years, the said country lying in the southwest corner of Uganda, immediately north of the Kagera river. The country was free from tsetse fly before 1905 and cattle grazed there. About 1906 tsetse came northwards across the Kagera, and soon afterwards cattle began to die from a new disease. With the removal of the cattle northwards, the fly was spread a few miles and in small numbers, mainly northwards. In 1914-15 military activity led to a great increase of local traffic (mainly mechanical) and since many hundreds of *G morsitans* might be smoked off a motor cyclist, this temporary influx of armies was soon followed by a great increase in numbers and a rapid extension in range of the fly along the line of northern communications. To check this spread a smoke-house (a rough shed of poles and grass wherein clouds of smoke were generated from damp foliage piled on a forge) was established, and through this shed all traffic, whether wheel or foot had to pass before leaving the fly belt but in the four years since the arrival of this human population the fly had advanced another 25 miles northwards—the spread being brought about by man. In 1919-20 the territory was devastated by rinderpest, both cattle and game being destroyed, and as a consequence the fly in the course of the next 5 or 6 years fell back nearly to the Kagera river.

In 1926 a discovery of tin led to a renewal of traffic, but the effect of this upon the spread of the fly has still to be discovered whether or not it is returning to the northerly limits reached during the War is still doubtful. On the experience of the war time smoke-houses have been established and are said to be holding the fly [Unfortunately although we are told that after a short term of fumigation, a motor cyclist loaded with many hundreds of flies would ride out of the smoke-house quite free from them, all that is said of the flies is that they disappeared.]

A. A.

RUTLEDGE (W.) Tsetse-Fly (*Glossina morsitans*) in the Koalib Hills, Nuba Mountains Province, Sudan.—*Bull Entom. Res.* 1928. Dec. Vol. 19 Pt. 3 pp 309-316. With 1 sketch map & 12 figs. on 2 plates.

The fly in this part of the Sudan is said to be restricted to the hills to breed in the shade of rocks and, owing to the scarcity of wild animals, to be dependent chiefly on the native Nubas and their livestock—dogs, pigs, cattle, sheep and goats. Trypanosomes have been found in the blood of these animals as also in the salivary glands of the fly but the cattle and sheep and goats are resistant to the disease. An attempt to control the fly by organized swatting during four months reduced their number to a certain extent but in some experiments with stick-plaster attached to cattle and to men's leggings the flies seem to have been scared by the glistening reflection from the wet sticky surface.

A. A.

- VAN DER KODDE (W. F.) The Presence of *Xenopsylla astia* in Semarang. Preliminary Statement.—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1928. Vol. 17 Pt. 4. pp. 530-534.

After the publication of HIRST's discoveries explaining the immunity from epidemic plague enjoyed by certain areas in Ceylon and India as due to the fact of *Xenopsylla astia* being the chief or only species of rat flea existing in such areas, the author investigated certain quarters of the city of Semarang (northern coast of Java) distinguished by a history of freedom from plague, and he found that there, too, the only rat flea in those quarters was *X. astia*. [Another contributory factor, as he points out, might be the absence there of the black rat.]

A. A.

- MAKAROFF (A. K.) [Einiges über die Erforschung der Ektoparasitenfauna der südlichen Ukraine. Flöhe.] [Flies of the Southern Ukraine.]—*Rev. Microbiol. Epidémiol. et Parasit.* 1928. Vol. 7 No. 14. pp. 431-434 [16 refs.] [In Russian. German summary pp. 463-464.]

From *suslik* (*Spermophilus*) *Ceratophyllus simplex* *Ctenophthalmus orientalis* *Neopsylla setosa* and *Frontopsylla swarna* from men, *Pulex irritans* *Ctenocephalides felis* and *C. canis* from a hedgehog, *Archaeopsylla erinacei* from brown rats, *Ceratophyllus fasciatus* and *Ctenopsylla musculi* from a mouse *Ctenophthalmus orientalis* and an unidentified *Ceratophyllus*.

A. A.

- WAGNER (J.) [Zur Benennung *Ctenopsyllus helenae*.] [On the Application of the Name *Ctenopsyllus*.]—*Konowia*. Vol. 8 No. 4. pp. 287-290 [Summarized in *Bull. Inst. Pasteur* 1929 Apr. 15. Vol. 27 No. 7 p. 334.]

The author thinks that by the law of priority the generic name *Leptopsylla*, which he states to be the name used in England for the mouse flea, should be changed to *Ctenopsyllus*.

A. A.

- ROCH (M.). Les piqûres d'hyménoptères au point de vue clinique et thérapeutique. [Clinical and Therapeutic Aspects of Stings from Hymenoptera.]—*Rev. Méd. Suisse Romande*. 1928. Nov. 18. 48th Year No. 14. pp. 913-950. [77 refs.]

This is a general review incited by personal experience of 137 cases of stinging by bees and wasps and hornets, but not going outside familiar tracks. Due notice is taken of the serious and even quickly fatal effects that occasionally follow such stings, as from an idiosyncrasy or from a temporary vulnerability of the victim or from a sting in parts where local swelling may obstruct breathing or may penetrate deep enough to send the venom straight into the bloodstream, or from many simultaneous stings. Respectful notice is taken of the current belief in the efficacy of bee-venom for treatment of rheumatism.

A. A.

- CURRY (D. P.) Blister Beetles of the Genus *Psephenus* (Coleoptera Staphylinidae) as a Cause of Dermatitis.—*Proc Med Assoc Islam Canal Zone* 1927 Vol. 15 pp 37-38. [1 ref.]

A report from Ecuador on the character of the notorious Staphylinid blister beetle *Psephenus irritans* stating that after abnormal rainfall it appears locally in such numbers as to bring about a violent epidemic of dermatitis sometimes so severe as to resemble erysipelas.

A. A.

- COUTELEN (F.) Parasitisme et thysanoures [Thysanura and Parasitism].—*Bull Soc. Path. Exot* 1928 Dec. 12 Vol. 21 No 10 pp 853-855 [3 refs.] [Parasit Lab Faculty of Med. Paris.]

[The Thysanura (bristle tails) in which the author includes also the Collembola (spring tails) is an order of small inconspicuous wingless insects of which the silver fish insect and the skip-tail are familiar examples.]

MEGNIN in 1878 described a case where swarms of spring tails were found in the epidermal exudations of some horses affected with a general and chronic pityriasis. FRÉCHET and BEILLE in 1896 reported a case of an old man well to live and fastidious in his person who for five years suffered from a pungent itching which spread from his scalp all over his trunk and limbs and in whose scalp bristle tails of the genus *Seira* were discovered. The author now relates the case of an elderly woman whose scalp for two summers was infested with Collembola of the common species *Lepidocyrtus curvicaulis* which caused a very lively itching. The author does not advance this as a case of true parasitism but he observes that some species of Thysanura are saprozoic, and others are commensals of ants and termites and hence come perilous near the border line.

A. A.

- SCHMAUS (L. F.) Case of Arachnoidism (Spider Bite).—*Jl Amer Med. Assoc* 1929 Apr 13 Vol. 92 No. 15 pp. 1265-1266 [Halstead Hosp Halstead Kan.]

Case of a young woman bitten on the elbow by a spider. Pain started at once and some hours later the arm was swollen and a general rash appeared. Four days later the rash seemed to be fading but next day when the patient came to hospital restless and anxious a scarlatina like rash covered chest abdomen arms and legs with some small pustules on the legs. The elbow was then still swollen and tender and the bite still showed as a small pustule. There were traces of albumin in the urine and the percentage of large lymphocytes in the blood was 32. Treatment—sedatives starch and sodium bicarbonate baths lead lotion locally. Result not recorded. The spider was identified as *Loxosceles rufescens* [*Loxosceles* is a genus of spiders widely distributed over the globe.]

A. A.

HASE (Albrecht) Zur pathologisch parasitologischen und epidemiologisch-hygienischen Bedeutung der Milben, insbesondere der Tyroglyphinae (Häsemilben) sowie über den sogenannten Milbenkese. Beiträge zur experimentellen Parasitologie. 3. [The Pathological Significance of Mites.]—*Ztschr f Parasitenk* 1929 Mar 26. Vol. 1 No. 4 5. pp. 765-821 With 8 text figs. [7 pages of refs.]

Of this long discourse on mites 7 close-printed pages are occupied by a valuable bibliography 9 are given to the subject of Altenberg milky cheese (cheese artificially infected with mites specially bred for the purpose of imparting flavour appreciated by gourmets) and another 12 to the oecology of mites—particularly of *Tyroglyphus atro* and to the proof that this familiar species does not eat mould and does not live together with mould in mass-culture but rather is confined to settled limits of moisture. Twenty five pages are thus left for mites that have a particular interest for the medical profession—and those dealt with here by the author belong almost entirely to the two families of *Sarcoptidae* (itch-mites) and *Tyroglyphidae* (food-mites). These are considered, independently and rather artificially (1) as causes of skin disease (2) as causes of allergic disease, (3) as causes of gastrointestinal disease and (4) as a whole in their epidemiologic and hygienic significance. In his discourse the author brings in all the well-known genera of *Sarcoptidae* and *Tyroglyphidae* that attack man, and also the notorious *Pediculoides ventricosus* and the harvest-mites (Trombiculae) of autumnal erythema but he overlooks the Trombiculae that cause the Tsutsugamushi fever of Japan and those responsible for a similar fever in the Netherlands East Indies. He also gives a list of the various industries and occupations in which the workers are particularly liable to be affected by mites either through the skin or by inhaling an atmosphere laden with milky dust. The compilation is a useful one.

A. A.

HIRST (A. Stanley) On the "Scrub Itch Mite" of North Queensland (*Trombicula hirsti* Sambon)—a Possible Carrier of Tropical Psittacanthus.—*Trans. Roy Soc Trop Med & Hyg* 1929. Mar 2. Vol 22 No 5 pp 451-452 With 1 fig [1 ref.] [Med. School, Univ Adelaide]

A note describing and figuring the diagnostic points of *Trombicula hirsti*, a species described by SAMBON in *Ann. Trop Med. & Parasitol* Vol. 22 June 1928.

A. A.

COLAS-BELCOUR (Jacques) Ponte et écloison des ornithodoros leur élevage. [Breeding Management of Ornithodoros.]—*Arch Inst Pasteur de Tunis* 1929 Mar Vol. 18. No 1 pp. 43-49. [10 refs.]

This paper dealing with details of ménage cannot be summarized. Some desert-loving species of *Ornithodoros*, namely *O. savignyi* and *O. moubata* come in for a good deal of mention, and information is given that in breeding them dry sand must be substituted for the usual provision of moisture. For example a replete female of *O. savignyi* is placed in a breeding-tube with dry sand in July and has a happy delivery of eggs in 14 days and the eggs hatch 16 days after

the event another replete female of the same species from the same host is placed in a breeding tube on the same day without any sand, and is still expecting in September two other replete females of the same species are put each into a breeding tube with the usual provision for humidity and remain apathetic for 34 days until they are supplied with sand then in 11 days they are delivered of eggs which hatch 10 days afterwards.

A. A.

DELANOE (P) Presence de l'Ornithodore du Maroc dans les terriers de porcs-épics et de renards et dans les habitations humaines. Son existence au Maroc oriental. Fréquence d'un spirochète récurrent chez les Ornithodores des terriers. [*Ornithodorus* in Morocco in the Earths of Porcupines and Foxes and as a Host of a Relapsing Fever Spirochaete.]—*C R Acad Sci* 1929 Apr 8 Vol. 188, No 15 pp 1013-1015 [3 refs.]

In Eastern Morocco and often in places there where pigs have never been kept *Ornithodorus maroccanus* is almost a constant partner in the earths of the porcupine and also often inhabits fox-earths, and there is frequently found—particularly in the former location—infected with a spirochaete of relapsing fever *O. maroccanus* has also been known to feed on man

A. A.

MOSEWIN (J A) Die Wirkung des Bisses der Zecke *Ornithodorus papillipes* Bir auf die Haut der Versuchstiere [Effect of the Bite of *Ornithodorus papillipes* upon the Skin.]—*Cent f Bak* I. Abt. Orig 1929 Jan 11 Vol 110 No 4/5 pp 208-213 With 2 text figs. [6 refs.]

The bite and saliva of *Ornithodorus papillipes* evoke in animals and man a local inflammatory reaction with the formation of a haemorrhagic papilla at the wound

A. A.

BUCHMANN (Max) Tutocain bei Skorpionenstichen [Tutocain in Scorpion Sting]—*Arch f Schiffs u Trop Hyg* 1928 Dec. Vol. 32 No 12. p 612

In the author's experience the very best treatment for scorpion sting is a local injection of 2cc. of a 1 per cent. solution of tutocain-suprarenin.

A. A.

PERUZZI (Mario) Sulla biologia e l'anatomia patologica della porocefalosi. [Biology of *Porocephalus* and Histology of the Lesions it produces.]—*Ann di Med Nav e Colon* 1929 Jan.-Feb. Year 35 Vol. 1 No 1-2. pp 1-19 With 19 figs. on 4 plates. [26 refs.]

The author's original observations refer to four cases of infection by *Porocephalus* in *Cercopithecus* monkeys at Entebbe, two of which had died after inoculation with trypanosomes and the other two from the *Porocephalus* infection itself. Along with severe peritonitis eight specimens were found free and moving in the peritoneal cavity of one 11 in the other apart from this inflammation and fibrosis were set up

in the liver by their migration. On section are seen a fibrous reticulum, polymorphonuclear leucocytes, macrophages, giant-cells, and an amorphous pigment and hyaline deposit, apparently the product of secretion of the glandular apparatus of the alimentary canal, and also small focal haemorrhages with remnants of red corpuscles, fibrin and cellular detritus. In the nymph stage, so long as the parasite is quiescent and encysted, it does no harm but if it escape from the cyst, it—like the larva—may migrate and set up the changes described above.

Some well-reproduced photographs illustrate the parasite and the lesions in the tissues.

H. Harold Scott.

PORTER (Annie) Note on a Porocephalid found in a Shangan in South Africa.—*South African Jl. Sci.* 1928. Dec. Vol. 23. pp. 359-363
With 3 text figs

Describes and figures the larva or nymph of *Armillifer armillatus* found encysted in the liver of an African dead of tuberculosis. The adult form is also figured.

A. A.

ARIAS SCHREIBER (Luis) & ESCUDERO FRANCO (Francisco) Un caso de mioma cutáneo.—*C. Ovario Méd. Lima.* 1928. Feb. Vol. 45. No. 778. pp. 65-61 With 1 text fig.

DE BUCK (A.) SCHOUTE (E.) & SWELLENGREBEL (N. H.) Studien über Anopheles ohne Malaria in der Umgebung Amsterdam.—*Cent. f. Bakt. f. Abt. Orig.* 1928. Nov 7 Vol. 109. No. 513. pp. 231-284. With 8 maps, 6 graphs & 3 figs on 1 plate [Refs in footnotes.]

LAVIER (G.) Sur quelques anomalies chez *Trypanosoma lewisi*.—*C.R. Soc. Biol.* 1929. Apr. 8 Vol. 100. No. 11. pp. 873-876. [2 refs.]

LEVINSON (L. B.) Die Anaphylaxie bei Protozoen. I Mitteilung.—*Zeich. f. Immunopath. u. Experim. Therap.* 1929. Vol. 60. No. 3/4. pp. 197-204 [8 refs.] [Microbiol. Research Inst., Education Commission R.S.F.S.R. Moscow.]

MARTINI (E.) Über parasitische Fliegenlarven nebst Bemerkungen über die Kultivierbarkeit pathogener Mikroorganismen.—*Dermat. Woch.* 1929. Apr. 13 Vol. 63. No. 15. pp. 548-552. [Inst. for Ship & Trop. Diseases Hamburg.]

MISERONI (A.) & HACKETT (L. W.) La reazione precipitante per stabilire la provenienza del sangue succhiato dagli anofeli.—*Bol. Istituto Sperimentale Malaria* 1929. May Vol. 8. No. 5. pp. 273-282. With text figs [3 refs.] English summary p. 282. [Experiment. Station, Anti-Malaria Campaign Rome.]

MITROPANOVA (Julia) On the Growth of the Head in the Larva of *Anopheles maculipennis* s. Meig.—*Bull. Entom. Res.* 1929. Mar. Vol. 19. Pt. 4. pp. 361-366. With 2 text figs. [Bact. Inst., Perm, Russia.]

MOCTEL (P. P.) *Anopheles bifurcatus* dans les gouvernements du centre agricole.—*Russian Jl Trop. Med.* 1929. Vol. 7. No. 1. pp. 46-57. [In Russian.]

OUELLEAU (F.) Un cas de myiase urinaire.—*Bull. Soc. Path. Exot.* 1928. Dec. 12. Vol. *1. No. 10. pp. 857-858.

PROVERA (P.) Sur l'inactivation du complément avec le venin de cobra.—*Bol. Sezione Ital. Soc. Internaz. di Microbiologia.* 1929. Apr. Year 7. Vol. 1. No. 4. pp. 79-80. [Serotherapy Inst., Milan.]

REIBENSTEIN (Ernst) Ein Fall von akuter Enteritis mit auffällender Vermehrung von *Blaschkeella hominis* im Stuhle.—*Klin. Woch.* 1929. Mar. 19. Vol. 8. No. 12. pp. 553-554. [10 refs.] [Police Hosp. Vienna.]

UNDULANT FEVERS

MANSON BAHR (Philip) & WILLOUGHBY (Hugh) A Critical Study of Undulant Fever. From a Series of Six Cases in the Hospital for Tropical Diseases, London.—*Brit. Med. J.* 1929 Apr 6. pp. 633-635 With 3 charts in text.

In view of the occurrence of cases of undulant fever (*abortus*) in man and cattle the authors consider that a brief account of the symptomatology of a series of cases would be useful. These cases were treated in the Hospital for Tropical Diseases in London, and came from such widely separated countries as India, Peru and East Africa and were all, without exception presumably infections with *Br. melitensis* although this is not definitely stated.

The definite diagnostic syndrome of the authors includes —

1. A high initial remittent pyrexia (up to 105° F)
2. Splenomegaly of a considerable degree.
3. Positive melitene reaction.

Among the most prominent symptoms were noted arthritic pains and peri-articular effusions headache with insomnia and late epistaxis.

The authors also point out that in most of the cases there was a specific adenitis occurring about the fourth month of the disease. Testicular pain was noted in half the number of the cases and profuse and drenching sweats in all. Blood culture was positive in four out of six cases and the agglutination test was positive in all.

D Harvey

KLING (C.) La fièvre ondulante en Suède. [Undulant Fever in Sweden].—*Bull. Office Internat. d'Hyg. Publique* 1929 Mar Vol. 21 No 3 pp 412-420 With 1 map in text. [1 ref.]

During the period December 23rd 1927 to August 4th, 1928 73 cases of undulant fever were diagnosed in Sweden. Since March 1928 all sera sent in to the Public Health Laboratories have been tested against *Br. abortus* and in this way 39 cases have been detected. The author calculates that there are from three to four new cases per week and, indeed there are more cases of undulant fever in Sweden than there are cases of paratyphoid B and the disease is just as prevalent as is true typhoid fever. By means of a map it is clearly shown that undulant fever in man occurs in the districts where contagious abortion is most prevalent.

Sixty four cases were analysed, and it was found that of these 18 were in women and 46 in men and the age period of maximum incidence was from 21-40 years.

A table is given showing the results of serological investigations of 30 cases both for agglutination and complement fixation tests and also the result of blood cultures. The author considers that the organism is more readily isolated by animal inoculation (guinea-pig) than by culture of the blood and also draws attention to the frequency of the zone phenomenon in the serological tests. The laboratory investigations showed that there was no difference between the bacteria isolated from cases of abortion in cattle and the bacillus isolated from cases of undulant fever in man. Further proof of the pathogenicity

of the *Br abortus* for man was shown by the fact that one of the laboratory workers engaged in the research contracted undulant fever in the laboratory.

Three thousand samples of sera sent in for Wassermann tests were tested for agglutinins for *Br abortus* and of these 145 agglutinated this organism in a dilution of 1:10 or higher. An interesting point is that of these 145 people 107 were women and 38 men, just the reverse proportion to that in the previously diagnosed cases.

Notification of the disease is compulsory in Sweden and prophylactic measures are to be enforced.

D. H.

KAVANAUGH (Chas. N.) The Epidemiology of Undulant Fever.—*Southern Med J.* 1929 Mar Vol. 22 No. 3. pp. 290-294 [33 refs.]

This paper consists of a survey of the literature on the subject of *melitensis* and *abortus* infections in man and in animals. It is stated that during the past year (1928) the State laboratories of Kentucky have agglutinated all sera submitted for the Widal reaction against *Bact. tularensis* and *Br abortus*. In this way ten cases of undulant fever have been diagnosed serologically and later proved clinically. Surveys have shown that up to 80 per cent. of herds are infected in some districts and practically no region is free. Elaborate suggestions for controlling the disease in cattle have been circulated by the authorities in Kentucky and the use of pasteurized milk is advised for all persons.

D. H.

LÖFFLER (W.) Zum Vorkommen und zur Diagnostik der Fehris undulans. [Incidence and Diagnosis of Undulant Fever].—*Schweiz. Med. Woch.* 1929 Mar 16. No. 11 pp. 304-307 With 3 charts. [8 refs.] [Med. Polyclinic, Univ. Zurich.]

The author relates the case of a veterinary surgeon who had been working with cultures of *Br abortus* and developed fever. He himself was of opinion that this was undulant fever but the agglutination and complement fixation tests for *Br abortus* were entirely negative, as also were repeated blood cultures. The case proved subsequently to be a tuberculous infection.

This investigation however threw light on a series of undiagnosed cases which had come under the care of the author. Later a definite diagnosis of undulant fever by positive blood culture was made in one at least of these cases and in others the diagnosis was confirmed by complement fixation and agglutination tests.

The first case was that of a farmer. It was found that three of his cows had recently aborted and he had personally attended them. The author remarks on the symptomless nature of the illness apart from the fever which may be high although at first the patient can go about his work and does not feel much the matter.

Enlargement of the spleen was noted in most of the cases, and in one where there was an accompanying lymphocytosis (81 per cent.)

splenectomy was performed with good result. A description of the histo-pathology of the organ is to be given in a later paper the principal change noted being numerous aggregations of endothelioid cells.

The author notes that in Switzerland, as elsewhere the disease is common among animals but rare in human beings who come into contact with them but he believes that mild and abortive cases may be discovered if the agglutination and complement fixation tests are more widely employed. He places more reliance on these two tests for diagnosis than on blood cultures. Amongst his ten cases only one was in a woman who was a clerk in a town and had had nothing to do with cattle but had eaten butter and boiled milk.

Brucella melitensis infection does not occur in Switzerland, where they are only concerned with abortus infection whereas in other countries for example Italy and America, the two infections may exist side by side.

Treatment was symptomatic vaccine and serum therapy which were given a trial were of little help.

D H.

HARDY (A. V) Undulant Fever A Clinical Analysis of One Hundred and Twenty-Five Cases.—*Jl Amer Med Assoc* 1929 Mar 16. Vol. 92. No 11 pp 853-860 [5 refs.] [College of Med. State Univ of Iowa, Iowa City]

This paper consists of a clinical analysis of 125 cases of infection by *Br abortus* diagnosed by positive agglutination tests and blood culture. The cases all occurred in the State of Iowa and an epidemiological survey has already been published [*ante* p. 439]

The author declares that the clinical description which most closely agrees with his impressions of the present series of cases is that of HUGHES made in Malta 35 years ago and that the typical picture of undulant fever with joint effusions described in most text books was but rarely met with [It should be pointed out that HUGHES's description refers to *melitensis* infection whereas the present series were infected with *abortus*] The general description of the cases is that the onset was slow and gradual, the first symptom being simply one of weakness or easy tiring and that both patient and physician were surprised to find that the temperature was 102° 103° or even 104° and yet the patient did not really feel ill.* The most characteristic symptom when the disease was established was that of night sweats which occurred in practically all the cases. Joint pains were only noted in one-third of the cases and effusion into the joints not at all. The type of fever was intermittent and remittent rather than undulant, although a few very severe cases of the undulant type were met with. Examination of the blood was carried out in only a few cases and beyond slight anaemia and leucopenia nothing remarkable was noted. In the majority of cases practically in all there was some enlargement of the spleen.

The author remarks on the striking variability in the clinical features and course and suggests that in all cases of indefinite illness with an

* See paper by LÖFFLER (above).

intermittent or remittent type of fever with enlargement of spleen and night sweats an agglutination test should be carried out with cultures of *Br. abortus* and blood culture should be attempted.

D. H.

CHARLES (J. A.) & WARREX (S. H.) A Further Case of *Brucella abortus* Infection in Man.—*Lancet* 1929 Feb 23. pp.386-388. [9 refs.]

This was a case of fever in a medical man who had not been out of England since 1908 and for the last eight years had been continuously employed in his professional duties in an institute near Newcastle-on-Tyne. He was in the habit of drinking daily about one pint of unboiled milk, which was obtained from a herd of cows kept at the establishment. He had fever for about one month and the original diagnosis was paratyphoid, a diagnosis which was suggested partly by the clinical symptoms and partly by the fact that this blood serum agglutinated an emulsion of para. A. in low dilution this latter fact might be explained by an inoculation of T A B vaccine in 1917. Symptoms of insomnia and irritability with profuse sweats were noted and the fever was remittent in type a slight degree of orchitis was also noticed. Agglutinations carried out later in the fever gave positive reactions up to a dilution of 1:2,500 with *Br. melitensis* and 1:5,000 with *Br. abortus*. Blood cultures were negative, as were injections of the patient's blood into guinea-pigs, but the diagnosis may be said to have been clearly established. It was found that one of the cows of the herd from which the patient had obtained the milk had aborted about eight months previously some of the secretion from the udder of this cow was obtained and injected into two guinea-pigs and these were killed a month later. From the organs an organism was obtained on liver extract medium which was culturally morphologically and serologically similar to *B. abortus* also the serum of the two guinea-pigs agglutinated *B. abortus* and *melitensis* to high titre.

D. H.

BETROUX (L.) Les pseudo-tuberculoses méliococciques contribution à l'étude des formes pulmonaires de la fièvre de Malta [Pseudo-Tuberculosis Forms of Undulant Fever].—*Presse Méd* 1929 June 26. Vol. 37 No. 51 pp. 835-836. [1 ref.]

It has been remarked that severe cases of undulant fever with wasting, paleness and severe sweats have been mistaken for phthisis and, indeed, the name Mediterranean phthisis has been given to such cases.

With the spread of undulant fever inland from the coast in France, the symptomatology of the cases has somewhat altered, and instead of the general wasting and fever attention has been drawn to a particular involvement of the lung also simulating tuberculosis. Four such cases have recently come under the care of the author and are described in detail. Three members of one family fell ill at one month intervals, the son aged twenty-eight his mother aged sixty-one and an uncle aged seventy. The first case was the most severe the next less so, and the third least. In all three the chief symptom apart from a prolonged undulant fever was in the chest. In the first case it took the form of a pleuro-pneumonia, yet some of the adventitious sounds met with in this type of tubercle were not present. In the second case a severe cough accompanied by vomiting and resembling whooping cough and in the third a congestion of the lung with a mild bronchitis. The agglutination reaction for *Br. melitensis* was strongly positive.

D. H.

TOULLEC (F) & BLANCHARD (M.) Sur le traitement de la méliococcie par la protéine de *Br abortus*. [Treatment of Undulant Fever by *Br abortus* Protein.]-*Bull. Soc. Path. Exot* 1929 Mar 13 Vol. 22. No 3. pp 150-152. With 1 text fig

This was a typical case of undulant fever reaction of Burnet positive agglutination positive in 1 200 dilution On the 22nd day the patient received a single dose of *abortus* endo-protein of Reilly the following day he had a rigor and a rise of temperature of 104 °F followed by a drop to normal there was no recurrence of the fever Thereafter he made a rapid recovery

D. H.

BURNET (Et.) & CONSEIL (E.) *B melitensis* et *B abortus*. Leur pouvoir pathogène pour l'homme et le singe. [*Br melitensis* and *Br abortus* their Pathogenicity for Man and Monkey]-*Arch. Inst. Pasteur de Tunis* 1929 Mar Vol 18. No 1 pp 21-42. With 5 charts in text. [5 refs.]

The authors are of opinion that the question whether *Br abortus* and *Br melitensis* are one and the same or distinct is still an open one.

So far as cultural characteristics morphology bio-chemical properties and immunity reactions are concerned, they are apparently identical, although some authors are prepared to find such differences as that *abortus* in primary culture requires a certain degree of anaerobiosis and EVANS in America says that they can be distinguished by agglutination and absorption of agglutinins.

The authors point out that up to a few years ago it could be said that *melitensis* was pathogenic for man and caused undulant fever whereas *abortus* caused epizootic contagious abortion in animals and was not pathogenic for man. But in view of recent developments this simple division must be reconsidered. They consider that the property of pathogenicity however is one which should be employed in experimental medicine rather than serological tests. And in pathogenicity there is this difference that *melitensis* is one thousand times more pathogenic for monkeys than *abortus*. Indeed only enormous doses of *abortus* will produce any effect at all in small monkeys.

The authors then review their experiments of six years ago [this *Bulletin* Vol. 20 p. 803] which showed that both men and monkeys were immune to inoculations of *abortus* cultures blood culture being negative and no agglutinins being produced in the serum and at the same time that these monkeys and men were rendered immune to subsequent inoculations with cultures of *melitensis* control volunteers who had not previously been inoculated developing the fever In this connexion it is pointed out that undulant fever is so common in Tunis and usually so mild, that no difficulty was experienced in obtaining volunteers.

In view of the discovery of cases of undulant fever occurring in countries where Malta fever does not exist and which were shown to be due to contact with cattle suffering from contagious abortion, and also since exception had been taken to the results of the previous experiments which were carried out with old laboratory cultures a new series of experiments was carried out with recent cultures, including some isolated from man which were considered to be *Br abortus*

The results of this second series agree with those of the original experiments except that in two monkeys the blood culture was positive

16 days after an enormous dose of *abortus* but no agglutinins were produced in the serum and there was no fever and all subsequent blood cultures in the same animals were negative whereas in the monkeys inoculated with *melitensis* a prolonged fever resulted, and blood cultures were positive throughout also agglutinins were produced in the blood serum.

A table is reproduced showing the results obtained in the case of four volunteers three men were inoculated with *Br abortus* 200 000 000 living germs subcutaneously and one with the same dose of *melitensis* before the inoculation the agglutination and melitene reactions were negative.

Strain.	Blood culture.	Fever	Melitene intradermally	Agglutination
1 Cattle— <i>abortus</i>	— —	None	+ + +	1500
2 Pig— <i>abortus</i>	— —	"	+ +	1600
3 Man— <i>abortus</i>	— —	"	+	1350
4 Man— <i>Melitensis</i>	+ +	Typical fever	+ + +	12000

It will be seen from the table that although no fever was produced by *abortus* inoculation and blood cultures were negative yet a certain amount of susceptibility was shown as evidenced by the fact that agglutinins were produced and the melitene reaction became strongly positive in two cases. All three volunteers (*abortus*) were subsequently given a test dose (*melitensis*) but no infection resulted.

The authors agree that the results of these experiments are not in agreement with more recent epidemiological experience they therefore suggest that in countries where both types of infection exist, all doubtful *abortus* cases in man should be excluded, and that as many cultures as possible taken from human cases of *abortus* infection should be inoculated into monkeys, and the results carefully observed and recorded, and also compared with inoculations of *melitensis* in other monkeys.

In this way the question might be settled, are these infections due to (a) *melitensis* derived from cattle or (b) to an *abortus* strain pathogenic for man and monkey?

D. H.

- i ASCOLI (A.) & SANFILIPPO (E.) Ueber Immunisierung gegen Mittelmeerfieber III Mitteilung (Immunisation against Oculant Fever).—*Ztschr f Immunitätsf u Exper. Therap.* 1929 Vol. 60 No 5-6 pp. 422-428. [Refs. in footnotes.] [Med. Clinic, Univ. Catania.]
- ii SANFILIPPO (E.) Ueber Immunisierung der Ziege gegen Mittelmeerfieber IV Mitteilung.—*Ibid* 1929 Vol. 61 No. 1/2 pp. 82-84. [Med. Clinic, Univ., Catania.]

i. The result of the authors experiments on the immunization of goats with *Br melitensis* is fully set out in tabular form. The method was to inoculate goats subcutaneously with varying doses of killed cultures of the organism. About a month later a test dose of the living organism was given either by the mouth or subcutaneously with each pair of inoculated animals a control animal was also employed.

A month later the animals were killed and careful cultural examinations of the liver spleen, bone marrow and kidneys were made. It was found that if the inoculum was less than the washings of six agar plates, a few colonies of *Br melitensis* could be recovered from the inoculated animals but if the inoculating dose consisted of the washings of 10 agar plates or more the organs of these animals were completely sterile whereas in every instance the *Br melitensis* could be readily recovered in very large numbers from the control uninoculated animals.

The infecting dose by the mouth was three 72 hour living cultures of *Br melitensis*

ii. Two goats were immunized in January 1927 by subcutaneous injection of enormous doses of *Br melitensis* killed by heat the washings of 4 8 and 18 agar plate cultures being used. In June and July the two animals were given the contents of six living cultures by the mouth, as a test dose. Two non-immunized controls received the same dose. No reaction followed these doses either in the inoculated or non-inoculated animals. In September the animals were killed and careful cultural examinations made of all the organs. In the inoculated animals all the cultures were sterile but in the two controls *Br melitensis* was readily cultivated from the mammary glands from the mesenteric lymphatic glands and from the bone marrow. It is also noted that in one of the controls during life the *Br melitensis* was cultivated successfully from the milk and also from the bone marrow but not from the blood. The author is of opinion, therefore, that the inoculation of killed cultures had prevented multiplication of the organism when administered by the mouth within the period of these experiments.

In one experiment the period elapsing between the immunizing and infecting test dose was six months and in the other one year

D H

VOGE (Cecil I B) The Agglutinating Action of Human Blood Serum upon *B abortus* (Bang) (A Preliminary Communication).—*Edinburgh Med Jl* 1929 Apr Vol. 36 No 4 pp 249-255 [31 refs.] [Animal Breeding Research Dept. Edinburgh.]

The author discusses the literature on the subject especially from the veterinary point of view. He records some results obtained in the agglutination of *Br abortus* with human sera. One hundred sera were examined and these fell, as a result of agglutination tests, into four groups.

		No. of Sera.
Group 1	No agglutination at all	15
Group 2.	Slight agglutination in 1 in 2	20
Group 3	Complete agglutination in 1 in 2	59
Group 4	Complete agglutination 1 in 10 and over	6

The final titres of these six sera were as shown below

1	1 10	trace	1 20
2.	1 80		
3	1 20	trace	1 40
4	1 20		1 40
5	1 20		1 40
6	1 10		1 20.

Of the sera, 6 per cent. were taken as positive the rest as negative.

D H.

ZANZUCCI (A.) Dimostrazione sperimentale del potere abortivo nelle vaccine del batterio melitense. [*Brucella melitensis* as a Cause of Abortion in Cows.]—*Giorn. di Clin. Med.* 1929 June 10 Vol. 10 No. 8. pp 507-510. [4 refs.] English summary p. 513. [Inst. General Path., Univ., Parma.]

The author obtained a culture of *Br. melitensis* from a human case of undulant fever in Sicily. He confirmed the nature of the organism by morphological, cultural, biological and serological characters, by Burnet's thermo-agglutination, Vercellana and Zanzucchi's boric acid, and Lusena's peptone reactions—moreover in the district where this case occurred there is no epizootic abortion.

He injected 2,000,000,000 organisms intravenously into four cows 4-6 months pregnant obtained from an abortion-free district and carefully protected from subsequent infection. Abortion occurred 80 and 88 days afterwards in the first two and 52 and 68 days in the second two. The bacillus was isolated from the placental exudate, the uterus of the mother and the fourth stomach of the foetus.

H. Harold Scott.

CUATRECASAS (J.) & GARCIA TORRES (L.) Un probable caso de fiebre de Malta con fracturas espontáneas.—*Rev. Med. Barcelona.* 1929. Feb. Year 6 Vol. 11 No. 62. pp 106-109

DENGUE.

BLANC (Georges) & CAMINOPETROS (J) Quelques observations épidémiologiques faites aux environs d'Athènes pendant l'épidémie de dengue. L'enseignement qu'on en peut tirer [Epidemiological Observations made near Athens in the Dengue Epidemic.]—*Rev d'Hyg et de Méd Préventive* 1929 Mar Vol. 51 No 3 pp 161-171 With 8 text figs. [12 refs.] [Pasteur Inst. Athens.]

The authors have already shown by carefully controlled experiments in the laboratory that dengue can be conveyed from man to man by the mosquito *Stegomyia fasciata* (*Aedes argenteus*) and also that the same species of mosquito caught in houses where dengue is present is capable of conveying dengue to susceptible volunteers. They here bring forward epidemiological evidence which also incriminates this insect.

On the road from Athens to Eleusis about three miles distant from the city a large factory is situated which employs about 150 men who live on the premises with their families in all about 400 individuals. Dengue broke out in this community and practically every one suffered from it. A mile further along the road is situated a large lunatic asylum of 16 pavilions with a population of about 700. One or two cases occurred here among the warders and doctors who had visited Athens, but there was no spread of the disease. Half a mile further on is a poor village of about 400 refugees here also there were a few cases of dengue but no spread.

On making a survey of these three places the authors found that at the factory the water was brought to the houses in an open canal and stored in open cement basins in small wash houses attached to the dwellings. In these basins they found innumerable eggs and pupae of *Stegomyia*, and numerous adult mosquitoes were found in the houses. At the asylum, on the other hand, the water is brought in closed pipes to a large cement reservoir which is completely closed from this the water is piped to closed metal cisterns at each pavilion and the mosquitoes have no place to breed—result no *Stegomyia* found in the grounds or buildings, and no dengue. A few *Culex* mosquitoes were caught and sand flies were very plentiful. At the refugee village water was not piped but was brought in carts and run into large metal petrol drums the aperture being then closed with a wooden plug and water drawn off from a tap. No breeding place for *Stegomyia*, no mosquitoes found and no dengue. Here also *Culex* mosquitoes were found and very numerous sand flies.

D Harvey

CARDAMATIS (Jean P) La dengue en Grèce. [Dengue in Greece.]—*Bull Soc. Path. Exot* 1929 Apr 10 Vol. 22, No 4 pp 272-282. [1 ref.]

The author studied an outbreak of dengue in the town of Aegina of about 3 000 inhabitants situated on the island of the same name. The infection was imported from Athens and the Piræus. He has reached conclusions which are at variance with generally accepted

views. As regards the etiology he gives a full account of the bionomics of *Stegomyia* and *Phlebotomus*, published by him in 1907 and 1908. Clinically the most constant symptom was hæmorrhage—he also observed that an outbreak of dengue lit up an attack of malaria in those who had already suffered from this disease.

Epidemiology—(a) During the outbreak of dengue in Athens, *Stegomyia* and *Phlebotomus* appeared to be present in about equal numbers; on the other hand, in Aegina the proportion was 50 *Phlebotomus* to 1 *Stegomyia*.

(b) A curve of the numbers of these insects followed closely the curve of the number of cases of dengue.

(c) The geographical distribution of the cases of dengue coincided with the distribution of these insects.

(d) *Stegomyia* was not seen at any place of a greater altitude than 1,500 metres but *Phlebotomus* might be found at 1,650 metres yet cases of true dengue and 3-day fever were met with in Greece in 1928 at places 2,000 metres above sea level.

(e) The grave and fatal cases were met with in the hottest time of the summer and it is suggested that this was due to a great multiplication of the virus in the insect vector.

Etiology—(a) Apart from *P. papatasi* and *S. fasciata* which have up to now been considered the only transmitters of dengue, it is probable that still other factors, or even conditions, unknown up to this time contribute to the propagation of the malady.

(b) Until the true microbic cause of 3-day fever and dengue have been discovered in the laboratory and in view of the fact that clinically these diseases are so similar we must admit for the time being their unity or, at any rate, their close relationship.

(c) The author is of opinion that the causes of dengue and 3-day fever are one and the same and that the character of the clinical manifestations depends on the development of the virus in two different insects and that, as a result, the mild cases of short duration are due to *P. papatasi*, whereas the severe cases of longer duration are caused by the bite of *S. fasciata*.

The author thinks that the experimental work in Athens and elsewhere, which went to show that *Stegomyia* is the sole transmitter, has not finally closed the argument.

D. H.

MACRIDI (Nicolas G.) I. épidémie de dengue à Athènes. [The Dengue Epidemic at Athens.]—*Rev. d'Hyg. et de Méd. Préventives*. 1929. Apr. Vol. 51. No. 4. pp. 241-287.

This is a long report to the Ministry of Health on the epidemic of dengue in Athens in 1927-1928. In 1927 the disease did not break out till October the epidemic was mild and of short duration, whereas in 1928 the outbreak, which commenced in the same district, occurred in July and therefore the climatic conditions were favourable for its spread and continuation over a much longer period. A full description of the clinical symptoms is given under the various systems, digestive, nervous, circulatory etc. and the influence of the disease on certain pathological states, such as tuberculosis, syphilis, malaria, is discussed. In the few post-mortem examinations held on people who had died of dengue without any complicating disease a condition of hyaline degeneration of the cardiac muscle was noted, accounting for the slow

pulse met with during life. The experimental work carried out at the Pasteur Institute in Athens is also referred to and a summary of the bionomics of the *Stegomyia* mosquito is given.

D H

OEKONOMIDES (Georg D) Erfahrungen beim Denguefieber [Experiences of Dengue.]-*Med. Klin.* 1929 Mar 1 Vol. 25 No. 9 (1264) p. 346.

The author who had a vast experience of the diagnosis and treatment of dengue during the epidemic in Athens in 1927-1928 gives a full account of the chief symptoms of the disease and also discusses the treatment which in the absence of a specific drug must be merely symptomatic.

Such elaborate clinical descriptions can be built up from experience of many cases but the difficulty of diagnosis still remains when isolated and atypical cases are met with at the beginning of an outbreak.

D H.

VERAS (Solon) La fièvre dengue chez les enfants pendant l'épidémie d'Athènes de 1927-1928. [Dengue in Children in the 1927-28 Athens Epidemic.]-*Arch. Méd. des Enfants.* 1929 Jan. Vol. 32 No 1 19 pp. With 10 figs. [12 refs.]

The author briefly discusses the epidemiology and etiology of dengue. He notes that very careful examination of the blood of many cases failed to demonstrate the spirochaete of COUVY. He gives a graphic description of an attack from which he himself suffered and states that there is no marked clinical difference between dengue in adults and in children. Dengue occurred in quite young children as young as 5 and 8 days. The rash is not constant, it is polymorphic and may resemble that of scarlet fever or of measles, or may be mixed. The slow pulse of adults is rare in children in the very young a rate of 120-160 may be found, and in older children from 80 to 120. No cases of jaundice were seen. Two cases relapsed after 8 days. Particulars of ten selected cases are given with the temperature charts.

D H.

PAPADOPOULO (Thésée) YOEL (M.) & HADJIGEORGES (A.) Sur les complications chirurgicales de la dengue observées dans ces services. [Surgical Complications of Dengue.]-*Presse Méd.* 1929 Jan. 12. Vol. 37 No. 4 pp. 49-51

The authors give an account of the surgical complications of dengue which were met with in the course of their hospital practice during the recent epidemic. A list is given as follows. Inflammation of tonsils in some cases followed by abscess formation, inflammation of the parotid gland and also of lymph glands in various sites necessitating

opening of abscesses osteomyelitis whitlow phlebitis. Each of these complications is discussed in a paragraph and illustrative cases are cited. Four patients died of septicaemia following on inflammation.

D. H.

ARAVANTINOS (John). Hospital Observations on Dengue Fever. Dengue's Effects on the Kidneys.—*Arch. Med. Bdgcs. (Bull. Internal Jt. Internat. Congress of Military Med. & Pharm. 2nd Year No. 3.)* 1929 Mar Vol. 82 No. 3. [English & French version on alternate pages.] pp. 162-170. [Milit. Path. Hosp. Athens.]

These observations were made by the author in the military hospital at Athens during the epidemic in 1927 and 1928. He notes that about 60 per cent. of his patients showed some degree of simple albuminuria during the fever and this condition may persist for a week afterwards. Other symptoms, suggesting that the organism of dengue or its toxin attacks the kidneys, are extreme pain in the loins and hips, vomiting and shivering, with occasional difficult breathing. In persons who are the subjects of acute or chronic Bright's disease, an attack of dengue may aggravate the disease and casts may reappear in the urine and if the heart also is affected, the condition may be critical, and a fatal issue may supervene.

D. H.

CHAKLOTIS (N.) & SCORDOMBEKIS (E.). Tuberculose et dengue étude clinique. [Tuberculosis and Dengue.]—*Presse Méd.* 1929. Mar 30. Vol. 37 No. 26. pp. 419-421 [4 refs.]

This paper deals with the effects of an attack of dengue in tuberculous subjects. A study of 1,500 cases coming under the care of the authors was made and the cases were divided into four categories as shown below.

1. Patients who had never shown any signs of tubercle previous to the attack of dengue.
2. Patients who had a history suggestive of tubercle.
3. Dengue patients who were known to be suffering from latent tuberculosis.
4. Dengue patients who had active tubercle at the time.

Of class one comprising some 1,400 cases, nine developed tubercle. Of class two (32 cases) three developed tubercle the remainder showed no sign of any change.

Class three (12 cases) one showed a recrudescence of latent tuberculosis the remaining eleven showed no change.

Class four (56 cases) in three cases of very active caseous tuberculosis of the lung aggravation was noted during the attack of dengue and two died in a short time.

A table is given of 17 cases in class four out of a total of 56, which were adversely affected by the attack of dengue these were mostly cases of open tubercle and ulcerative and not fibrous. In the remaining 39 cases of active tuberculosis there was no alteration in the condition.

Conclusions.—Dengue, being a fever of short duration has little effect in provoking or aggravating tubercular attacks it is less tuberculogenic than say measles.

D H.

PAPANIKOLAOU (B) Denguefieber und Lungentuberkulose. [Dengue and Tuberculosis.]—*Ztschr f Tuberkulose*. 1929 Mar Vol. 53. No 2. pp 107-111 [6 refs.]

The author gives his experience of the effect of dengue on tuberculosis. He cites the case of a young girl with a family history of tuberculosis who after an attack of dengue, developed an acute infection of the lung with continued fever and tubercle bacilli in the sputum. So far as his experience went, an attack of dengue had no effect whatever on people actually suffering from phthisis nor did it cause recrudescence in recovered and latent cases of tubercle.

D H

MOUTROUSSIS (Konstantin) Befunde von rickettsiaartigen Gebilden und Einschlüssen in mit Denguefiebertivirus infizierten Stegomyien. [Rickettsial Forms and Inclusions in Stegomyia Infected with Dengue Virus.]—*Arch f Schiff's u Trop Hyg* 1929 June. Vol. 33. No. 6. pp. 330-333 With 2 coloured figs. on 1 plate.

In the end of September 1927 the author collected 15 *Stegomyia* from a house in Greece where there were six cases of dengue. He examined the stomach contents by staining smear preparations with Giemsa. In three of the mosquitoes he found small red-staining bodies similar to *R. prowazeki*. He continued these experiments in 1928 using laboratory bred mosquitoes. He fed female mosquitoes four days after hatching out on dengue patients in the first 48 hours of the disease. He kept the mosquitoes alive on sugar water and found that they became infective for man about ten days after the infecting feed and remained infective during their life.

He stained smear preparations of these infective mosquitoes with Giemsa and found very numerous Rickettsia like bodies. *Stegomyia* which had not been fed on dengue patients did not show these bodies nor did *Culex* or sand flies even when so fed.

Two coloured plates are given one showing Rickettsia like bodies lying free and the other showing the same bodies lying in the blue protoplasm of cells. No bodies could be found in the salivary glands of infective mosquitoes.

D H.

JOANNIDIS (Georges Sp.) L'examen morphologique du sang dans la fièvre dengue. [The Blood in Dengue.]—*Athènes Méd* 1929 Jan. 4 pp. [11 refs.]

Blood films were fixed in alcohol and stained with Giemsa. The red cells showed no change and no parasites were seen in them. In the

large mononuclears the nuclear substance is condensed and the contour of the nucleus no longer sharp and large chromatin lumps can be seen in the protoplasm. In the polynuclears the nuclear substance is also condensed in places and in some the nucleus is broken up into several fragments or vacuolated and the granules may disappear.

It is suggested that these changes may have been artificial, but films prepared from healthy people and from cases of fever other than dengue did not show them and the changes were most marked in severe cases of dengue.

The author suggests that dengue should be considered as leucotoxic and therefore laying the patient open to secondary infections.

D. H.

BLANC (Georges) CAMINOPETROS (J) DUMAS (J) & SAINT (A).
Recherches expérimentales sur la sensibilité des singes inférieurs
au virus de la dengue. [Experiments on the Susceptibility of
Monkeys to Dengue.]—*C. R. Acad. Sci.* 1929 Feb. 4. Vol. 188.
No. 6. pp. 468-470

The authors inoculated monkeys of various species—*Macaca*, *Cercopithecus*, etc.—with blood from patients suffering from dengue. None of the monkeys showed any rise of temperature or symptom of illness, yet after an incubation period of from 5 to 8 days their blood when inoculated into susceptible human volunteers gave rise to attacks of typical dengue—the blood was not infective after the 12th day or before the 5th. These monkeys whose blood had been shown to be infective if re-inoculated with fresh infective blood from cases of dengue showed no symptoms and their blood did not become again infective for man, thus showing that they had acquired immunity.

The blood of monkeys which had suffered from "inapparent dengue" was proved to be non-infective for other monkeys. This phenomenon falls into line with experiments on "inapparent" or symptomless typhus in guinea-pigs.

[That is, it is not possible to produce inapparent typhus or dengue in the same species of animal in series.]

D. H.

BLANC (Georges) & CAMINOPETROS (J) Durée de conservation de
virus de la dengue chez les *Stégomyia*. L'influence de la saison
froide sur le pouvoir infectant. [Duration of Maintenance of
Dengue Virus in *Stégomyia*. Influence of Cold Season.]—*C. R.*
Acad. Sci. 1929. May 6. Vol. 188. No. 19. pp. 1273-1275.
[2 refs.]

The authors succeeded in keeping *Aedes* mosquitoes alive for seven months. They were shown to be infective up to January 15th, ceased to be so during February and March, and again became infective in April. It was found that at temperatures below 18° C. the mosquitoes ceased to be infective. The greatest duration of infectivity was 174 days. Also mosquitoes captured in dengue houses gave the same results, i.e., they caused infection in November but not in January February or March, but again became infective in April.

Laboratory-bred mosquitoes experiment —

Fed on December 22nd on case of dengue

Fed on March 1st. No infection 69 days

Fed on March 11th. No infection 79 days.

Fed on April 5th. + + 104 days

D H

BLANC (Georges) CAMINOPETROS (J) & GIROUD (P) Action du sérum anti-maryillique et du sérum contre la peste porcine sur le virus de la dengue. [Action of Anti-Yellow Fever Serum and Hog Cholera Serum on Virus of Dengue.]—*Bull Acad Méd* 1929 Mar 27 Year 93 3rd Ser Vol. 101 No 12 pp. 442-444 [4 refs.] [Pasteur Inst. Athens.]

The close analogy between yellow fever and dengue has often been noted, and dengue has been described as a mild form of yellow fever. Haemorrhages, black vomiting, jaundice and albuminuria are met with in both diseases.

An anti yellow fever serum has been produced in horses by inoculations of virulent liver from monkeys. A monkey infected with yellow fever was killed and a fragment of liver rubbed up with sand and treated with formalin. A rabbit received three intraperitoneal injections at 10 days interval and 10 days later blood was drawn off and serum taken.

Several volunteers were given doses of this serum and subsequently doses of infective serum taken from dengue cases but all developed dengue. As this yellow fever serum had been shown to be active against yellow fever virus it would appear that dengue virus and yellow fever virus are distinct and separate.

A hog cholera serum was also of no avail in the prevention of dengue.

D H.

BLANC (Georges) & CAMINOPETROS (J) La dengue donne-t-elle l'immunité? [Does an Attack of Dengue confer Immunity?]
C R Soc. Biol 1929 Jan 11 Vol. 100 No 1 pp 31-33
[5 refs.] [Pasteur Inst. Athens.]

Most people agree that an attack of dengue confers immunity but SILER and his co-workers say they were able to reinfect volunteers experimentally.

In the months of February and March 1928 Blanc and Caminopetros inoculated numerous volunteers (80) 25 of them developed experimental dengue. Twenty remained in hospital in December 10 months later. These people were exposed to natural infection in hospital with other cases but all escaped. Nine of them were re-inoculated with heavy doses of infective blood and none reacted, whereas the controls did.

MANOUSSAKIS experiments agreed with the above results. [*anc* p. 41]

People who had dengue in 1927 in the great majority of cases escaped in 1928.

In the author's opinion dengue confers a high degree of immunity which is of considerable duration.

D H.

BLANC (Georges) & CAMINOPELOS (J). Action du sérum et du sang total des convalescents et guéris de dengue sur le virus. [Action of Serum and Whole Blood of Convalescents from Dengue on the Virus.]—*C R. Soc. Biol.* 1929 Feb 15. Vol. 100, No. 6 pp. 393-395. [2 refs.] [Pasteur Inst. Athens.]

The authors agree with MAKOUSSAKIS and others, that one attack of dengue confers a lasting immunity. But has the serum of these immune people any effect on the virus? And can it confer passive immunity on others?

As the result of experiment they find that the serum of immune people has no neutralizing effect either if injected before or with the virus or if left in contact with the virus before injection, either at 0° C. or 37° C. It did not matter whether the serum was taken during the attack, at the end, or one six or ten months later.

They then tried the whole blood. Whole blood of convalescents was injected into volunteers followed by a test dose of infective blood. A typical attack of dengue followed. This experiment was repeated several times with variations as to time of taking the blood, but no protective power was shown.

Conclusions.—Neither serum nor whole blood of convalescents from dengue has any neutralizing or protective power against the virus of dengue.

D. H.

SCHUMPP-PIERON (P). Les complications fatales de la dengue. [Fatal Complications of Dengue.]—*Presse Méd.* 1929, Feb. 13 Vol. 37 No. 13. pp. 206-207.

An account of dengue in Egypt in 1928. Probably 30 per cent of the population were affected. One of the first epidemics described was that of 1779 in Cairo the name "mal des genoux" was then given to the disease on account of the "break bone" pains. It is generally agreed that the disease is only rarely mortal, but in Athens recently many deaths have been reported and people in Egypt were naturally somewhat disturbed. The author discusses the chief complications which might cause a fatal issue—hyperpyrexia, haemorrhages, severe vomiting, and albuminuria caused no deaths, in his experience. Two deaths from syncope 24 hours after defervescence were brought to notice both showed bradycardia. Atropine and rest in bed should save all such cases.

Conclusions.—It is most exceptional for dengue to be fatal in itself, however violent the symptoms. The author saw no deaths although called in consultation in many severe cases. Five thousand cases were admitted to hospital in Cairo with only one death in an old woman of 73 some days after fever had ceased. Mortality rate 1-5 000-1 10 000. [CARDAMATIS gives the mortality rate in Greece as 1 in 61 000.]

D. H.

GOLDIE (Horatio). Notes on the Epidemic of Dengue in Tiberias.—*Trans. Roy Soc. Trop. Med. & Hyg.* 1929, Jan. 30. Vol. 22 No. 4 pp. 385-390. [4 refs.]

In practically all the cases seen in an outbreak of dengue in Tiberias there was a double rise of temperature with a day or so of normal

temperature between. The author also notes, as did MILLER (below) that there was usually an enlargement of the superficial lymphatic glands. Careful total and differential counts of the white blood cells were made in nearly 200 cases, and the interesting points brought out were that at the beginning of the fever there is as a rule a leucopenia followed later by an increase in the lymphocytes which usually disappeared at the end of the first stage of fever this was followed by a mononucleosis during the afebrile period and in the second stage of fever accompanied later when the secondary rash appeared, by some increase in the eosinophile cells.

The author notes the similarity between the symptoms of the secondary fever stage with those of serum disease and suggests that this phase may be of the nature of an anaphylactic condition. Acting on this hypothesis he treated a number of cases with atropin, 0.5 cc. of 1:1000 solution, and calcium chloride in doses of 60 grs. for five days, with excellent results. In most of the treated cases the secondary phase was either very slight or non-existent.

D. H.

MILLER (J. E.) *Dengue. A Study Based on 100 Cases.*—*U.S. Nav. Med. Bull.* 1929 Jan. Vol. 27 No 1 pp. 77-86.

In the author's experience dengue was a five-days fever in 100 per cent. of his cases. In the Philippines, where the author has studied the disease, there is no doubt that the *Aedes* mosquito is the vector. The disease in these islands is more prevalent in the cities than in the country districts the opposite is true of malaria. A Mosquito Control Commission has been constituted and the chief measures advocated are filling in the low lands and the removal of domestic breeding places, such as old pots, pans, jam jars etc.

Enlargement of lymphatic glands was noted in 75 per cent. of the cases symptoms of an involvement of the sensory nerves was evidenced by the acute pains in the legs and arms and backache. It is suggested that an examination of the cerebro-spinal fluid might be of interest. The rash of dengue is macular rather than punctate and it is darker than that of scarlet fever but lighter than that of measles. When the rash first appears about the fourth day there is a feeling of tingling and numbness as if insects were creeping under the skin. Mild ambulatory cases are common but even in these the tender enlarged lymphatic glands can be detected. The absence of Koplik's spots and coryza serve to distinguish from measles.

The treatment is symptomatic, but great relief was obtained from the use of codeine for the acute pains.

D. H.

CARTON (A.) *Note sur une épidémie de dengue à Saint Louis (Sénégal) en 1926.* [*Dengue Epidemic at Saint Louis in 1926*]—*Bull. Soc. Path. Exot.* 1929 Mar 13 Vol. 22 No 3 pp. 228-229.

One hundred cases of dengue which differed somewhat from the classical description. The most prominent symptoms were sub-orbital neuralgia, five-days fever slow pulse an indeterminate rash appearing on the third day loss of appetite and weakness.

D. H.

POGGI (Igino). Note cliniche sul decorso di una epidemia di dengue in Rodi. [An Outbreak of Dengue on Rhodes Island.]—*Arch. Ital. Sci. Med. Colon* 1929 Feb. 1 Vol. 10 No. 2 pp. 72-77 With 1 chart in text. English summary p. 78. [Inst. of Trop. Path., Univ. Bologna.]

Seventy cases were notified in a regiment stationed in Rhodes in the summer of 1928 and many others occurred. All were apparently mild, but otherwise typical, showing none of the anomalies recorded in the epidemic at Athens.

H. Harold Scott.

ROSENBERG (Max). Die Dengue in ihren Beziehungen zu Malaria. (Dengue in Relation to Malaria.)—*Arch. f. Schiff- u. Trop. Hyg.* 1929 July Vol. 53. No. 7 pp. 398-399

The author considers the question whether malaria does or does not influence an attack of dengue. Unfortunately only thirteen cases were available. He noted that in eight of these all suffering from malignant tertian malaria, the initial rash was absent, but in no other respect could he detect alteration in the symptoms.

D. H.

BERGER (E.) Das Denguefieber und der Verlauf der Epidemie in Griechenland im Sommer 1928.—*Schweiz. Med. Woch.* 1929 May 11. No. 19 pp. 488-501 [19 refs.] [Hyg. Inst. Univ., Basel.]

BLANC (G.) Remarques à propos de la note de M. Manossekis. Quelques recherches expérimentales sur la dengue.—*Bull. Soc. Path. Exot.* 1929 Feb. 13 Vol. 22. No. 2 pp. 68-69 [1 ref.] [Pasteur Inst., Athens.]

GARRI (Umberto). Sulla febbre dengue in Grecia nel 1928.—*C. rend. Acc. L.* 1929 Apr. 30 & May 7 Vol. 10 Nos. 6 & 7 pp. 335-338 341-344 347-350 353-354 407-410 413-416 419-422 425. With 8 figs. & 1 map.

MANOSSEKIS (E.) Quelques recherches expérimentales sur la dengue. A propos de la communication G. BLANC J. CAMPOSTRASSI et E. MANOSSEKIS.—*Bull. Soc. Path. Exot.* 1929 Jan. 9 Vol. 22. No. 1 pp. 22-23

UNCLASSIFIED FEVERS

CONSEIL (E.) La fièvre boutonnière de Tunisie et la fièvre exanthématique de Marseille. Leur identité.—*Bull. Acad. M/d.* 1929 Jan. 15. Year 83. 3rd Ser. Vol. 101 No. 2 pp. 74-78

— La fièvre boutonnière. Son identité avec l'érythème infectieux ou fièvre exanthématique de la région Marseillaise et la fièvre éruptive d'Italie. [Identity of "Fièvre boutonnière," Exanthematic Fever of Marseilles, and Italian Eruptive Fever.]—*Arch. Inst. Pasteur de Tunis.* 1929 Mar. Vol. 18 No. 1 pp. 86-132. With 6 charts. [48 refs.]

After a visit to Marseilles where he saw several cases of eruptive fever, Conseil is convinced that this is identical with a disease known in Tunis since 1910 and called "fièvre boutonnière." In his opinion the name "fièvre boutonnière" should be retained for this disease wherever it occurs. This name, suggested by Ch. NICOLLE, indicates the two chief features of the disease, fever and an eruption which can be felt under the skin like small buttons.

An historical account is given, and it is shown that the first cases were noted by COXON and BRUCH in 1902 near Tunis, and described

by them with other cases in 1910. Similar cases have been described in Roumania, in Tripoli, and in Italy and France.

A very full clinical account follows and special interest attaches to the description of the *tache noire* or primary sore. This is described as a small rounded blackish scar about the size of the head of a pin or a small pea, not painful. It may be situated on any part of the body, usually the lower limbs. Usually also the glands draining the area are slightly enlarged. The rash appears first on the abdomen as small rose spots slightly raised on an indurated base. The lesion says the author is neither a macule nor a papule but is best described by the vague term button. Hence the name of the fever. There are successive crops of these spots which at first are not numerous and are restricted to the abdomen, chest, and front of the limbs but in a day or two they increase in numbers and spread to the face and to the palms and soles. The rash persists even after the fever has ceased. The various signs and symptoms are discussed in detail.

As regards the question of the identity of exanthematous fever (Marseilles) and eruptive fever (Italy) with the *fièvre boutonneuse*, the author has collected the various descriptions of these diseases by different authors and gives them in full and it will be seen that these accounts agree as he says practically word for word.

About laboratory research he has not much to say. Blood culture has been invariably negative as also have agglutination tests with *typhosus* and *melitensis*. For the Weil-Felix reaction the author is of opinion that since this is not a specific reaction, not much reliance can be placed on it. A few of the Marseilles cases gave a positive reaction, but only in low dilution. The author's view is that these results should be looked on as an interesting observation but without value as regards the diagnosis or the nature of the malady.

The author points out that monkeys are susceptible to inoculation with blood taken between the 3rd and 9th day of the disease and that guinea-pigs are resistant yet guinea-pigs which have been inoculated with blood from cases of Marseilles fever are susceptible to inoculation with typhus virus.

As regards the etiology the author is inclined to agree with OLIER that the disease may be carried by the dog tick (*Rhipicephalus sanguineus*). He found no lice on his cases and he is convinced that the disease is not infectious as is measles or small pox. This is a strong point in the differential diagnosis. The rash and its persistence also the length of the fever distinguish it from dengue.

The author then is of opinion that *fièvre boutonneuse* is a definite clinical entity distinct from typhus and Brill's disease but one and the same with exanthematous fever and eruptive fever and that the original name should be retained.

D Harvey

TRABAUD (J). La fièvre boutonneuse de Tunisie la fièvre exanthématique de Marseille et la dengue de Grèce et de Syrie ou dengue méditerranéenne. Leur identité probable. [Probable Identity of "Fièvre boutonneuse," Eruptive Fever and Dengue.]—*Bull Acad. Méd.* 1929 Apr 23. 93rd Year 3rd Ser Vol. 101 No 15 pp 528-533 [2 refs.]

The author after perusing CONSEIL'S paper is of opinion that the diseases described by the latter are really dengue. He compares in

parallel columns the descriptions of "fièvre boutonneuse" as given by CONSEIL and the description of dengue as given by DR BURN and SACORRAPOS taking first of all the fever and then the rash, the joint pains and the slow convalescence he also points out that both diseases occur in the summer. The only differences are the length of fever and the "tache noire" which in Trabaud's opinion, is such a minor incident that it might readily escape notice in a patient covered with a rash. He considers that the cases in Tunis and Marseilles are but outposts of general epidemics of dengue.

[No mention of animal experimentation or Weil-Felix reaction.]

D. H.

BURNET (Et.) & DURAND (P.) Place de la fièvre exanthématique (=fièvre boutonneuse) dans le groupe des fièvres indéterminées. [Eruptive Fever placed in the Group of Unclassed Fevers].—*Bull. Soc. Path. Exot.* 1929 Feb 13 Vol. 22 No. 2 pp. 85-91 [Refs. in footnotes.]

A plea for placing the eruptive or exanthematous fever of Marseilles among the unclassified fevers. The authors consider that it comes somewhere between true typhus and Japanese river fever and might be classed with so-called tropical typhus and "tick" typhus of India, which it resembles in many particulars, including the tache or primary ulcer. Another point of similarity is that the rash is to be found on the palms and soles. The authors again enumerate the points which distinguish this fever from true typhus and also from Brill's disease. These are absence of lice, Weil-Felix reaction negative, the blood infective for monkeys but not for guinea-pigs, monkeys which have been infected with blood from these cases still react when injected with typhus blood and vice versa, that is, monkeys which have reacted to typhus blood will if subsequently inoculated with blood from cases of Marseilles fever again react. The authors are convinced that the so-called "fièvre boutonneuse" is identical with the Marseilles fever.

D. H.

DUMAS (Jean) Au sujet de l'exanthème infectieux méditerranéen appelé aussi fièvre exanthématique du littoral. [Eruptive Fever of the Mediterranean.].—*Rev. Méd. de France et des Colonies*. 1928 Jan. Feb & Mar. Vol. 6 Nos. 1 2 & 3. pp. 3-33 65-64 117-148. [4 pages of refs.]

This voluminous paper published in three parts, consists almost entirely of a review of the literature on the subject of "eruptive fever," and the majority of the papers referred to have already been reviewed in this *Bulletin*.

The author considers that the first person to identify the disease was Dr. ROCHE, of Avignon who told him personally that for thirty years he had been accustomed to see, every summer, a few cases of this fever. MARTINI, of Aubergne noted a case about 1910 and FOURCIEUX in 1917 noted cases of this disease at Cannes, and from that date cases

have been occurring every summer. But CARDUCCI * of Italy was the first to publish an account of the disease. He had collected sixteen cases from 1910 to 1920.

But it was not till 1922 that many cases were seen in Marseilles and its suburbs and up to 1927 the cases have gradually increased in number although always scattered throughout the city.

Follows then detailed clinical descriptions by various authors French and Italian of cases of this disease. Some of these have already been published and others are taken from the hospital records and notebooks of practitioners.

These descriptions are then analysed by the author and a composite picture of a typical case presented. This is followed by a clinical description of Brill's disease since these two diseases are often confused and some medical men believe that they are one and the same. Some mention is also made of tropical typhus, Rocky Mountain fever and Japanese river fever.

It is pointed out that so far the Weil-Felix reaction is constantly negative in the Marseilles fever and positive in Brill's disease and in tropical typhus. A review of some of the literature concerning the Weil-Felix reaction follows. Some interesting observations were made by the author who tested the serum reaction of several cases convalescent from true typhoid fever (*Bact. typhosum*). Three strains of *Proteus* were used, one being the strain Kinghorn used by FLETCHER in Malay. The author found that the serum of several of these cases agglutinated this strain in a dilution of 1:100 to 1:200. He therefore considers that results of this order should not be accepted as diagnostic.

The author finally gives certain reasons for considering that the Marseilles disease is a disease *sui generis* and not Brill's disease.

1. There are definite clinical differences.

2. Inoculation and immunity reactions in animals separate the diseases.

3. The Weil-Felix reaction is strongly positive in Brill's disease and not so in Marseilles fever.

The following conclusions are arrived at —

The disease recently described is not a new disease. It has occurred in the neighbourhood for many years.

There are definite and indisputable clinical differences between Marseilles fever and Brill's disease and also the other forms of exanthematous typhus.

Guinea-pig inoculations have invariably been negative whereas this is the only indisputable method for the identification of true typhus.

More research is necessary to establish the true etiology and nature of this malady.

D. H.

DUNLOP (George A.) *Pyrexia of Seven Days' Duration of Undetermined Origin.—Malayan Med. J.* 1929 Mar Vol. 4 No 1 pp. 6-8. With 4 figs. [7 refs.]

This outbreak occurred in Kuala Lumpur between March 19th and April 20th 1928.

The cases described were all in Europeans but a similar fever occurred in a group of Malay agricultural workers at the same time. The cases (8 in all) were at first diagnosed as influenza, but experience threw doubt on this diagnosis. The onset was sudden with headache

chill and sweating but no rash and no jaundice the pulse was slow compared with the temperature there was no enlargement of the spleen and no malarial or other parasites were found in the stained films of blood. The disease was apparently infectious, since in at least two instances several cases arose in the same family. The suggestion of leptospiral infection is made but unfortunately no attempt was made to cultivate from the blood nor to inoculate experimental animals. If similar cases should be met with, attempts at culture could be made early in the fever.

D. H.

RAO (S. Sundar) *The History of Tick Bites in Cases of Tick Typhus in India.*—*Indian Med. Gaz.* 1929 Feb. Vol. 64, No. 2 pp. 76-77 With 1 text fig. [1 ref.] [Calcutta School of Trop. Med. Calcutta.]

This paper gives the distribution of tick typhus in India. The author points out that although there has been a history of tick bite in some only of the cases yet tick bite was possible in all, i.e., the cases occurred in persons who had recently been exposed to such risk in jungle or in camp. He notes too, that there is a great probability of ticks and their bites being overlooked and cites two cases in support of this contention. An educated man employed on the geological survey returned after a journey in tick-infested country. In spite of careful bathing and change of clothing it was only 17 days later that he discovered a tick deeply embedded in the skin of the thigh. In the other case an entomologist carefully removed and identified several ticks, and after washing and bathing considered himself free, but 8 days later found one embedded in the skin.

Neither of these men contracted tick typhus, but the author's point is, that if these two people who were on the outlook for ticks failed to notice the bites and did not discover the ticks until several days had elapsed, little reliance can be placed on the statement, "no history of tick bite" in cases of tick typhus.

In all cases of tick typhus in addition to enquiry for a history of tick bite a very careful examination of the patient should be made, and the ticks, if found, should be identified. Small ticks may be almost completely embedded in the skin if they have been attached to the patient for any length of time.

D. H.

SMITH (S.) *The Abortive Fevers of the East.*—*Jl. Roy Army Med. Corps.* 1929 June Vol. 52, No. 6, pp. 419-423. (3 refs.)

The author in his capacity as medical officer in charge of the Malaria Treatment Centre, Hasanli, has had unique opportunities of studying records of soldiers suffering from short fevers. He quotes freely from a paper by Heatly SPENCER, already summarized in this *Bulletin*. He pleads for some diagnostic "pigeon hole" for febrile attacks lasting from one to seven days, which fit into no known pathological or symptomatic group, and he suggests the term "short pyrexial attack," or "S.P.A." (Apparently in India, with a view to preventing

wholesale dumping in the P U O category this particular title has become hedged around with conditions but why should not S P.A. also suffer in time from the same drawback ?]

D H.

PHASE (R. N) *Report on the Investigation of Short Fevers at Kamptee, Central Province, 1928.—Jl Roy Army Med Corps 1929 June. Vol. 52. No 6 pp 404-418. With 4 charts. [8 refs.]*

The observations recorded are the outcome of an investigation carried out at Kamptee in the Central Provinces India into the nature epidemiology and characteristics of an acute specific fever which occurs in epidemic form with marked annual regularity in that station.

This research was one of the special schemes of investigation carried out in India under the aegis and at the suggestion of the D M.S. India, and with funds provided from Headquarters and made possible by the new pathology organization in India.

The greatest number of cases occurred during June July and August A careful record of the meteorological conditions at the station is given and an entomological survey of the area was carried out. As regards symptomatology there were two types of pyrexia. Type I a fever of three days duration and Type II consisting of a primary pyrexial period of two or three days followed after three or four days of apyrexia by a recurrence of fever which lasted for 24 to 36 hours.

Very careful laboratory investigation of selected early cases was carried out, consisting of blood counts examination of blood films blood cultures on media suitable for cultivation of leptospira, and animal inoculation carried out at the bedside. 2 to 3 cc. of blood from 17 cases was injected intraperitoneally into guineapigs none of the animals showed any signs of disease either during life or when killed and examined. A few rabbits were also inoculated, but without result. All the blood cultures in Fletcher's medium were sterile.

Careful dark-ground examinations of fresh citrated blood were also carried out but nothing in the nature of a spirochaete or leptospira was seen, except some pseudo spirochaetes which could not be stained by Fontana's or Leishman's stain. These bodies were identical with the pseudo-organisms described by KNOWLES.

As a result of his investigations the author is of opinion that two separate and distinct types of fever exist in Kamptee at one and the same time the simple type of fever being sand fly fever carried by *Phlebotomus* and the more severe and relapsing type carried by *Stegomyia*. The first type is readily identified with sand fly fever but the fact that a rash was only rarely seen renders a definite classification of the second type as dengue difficult. Yet outbreaks of undoubted dengue have occurred in India when the rash was only seen in about 7 or 8 per cent. of cases. The author therefore considers that dengue and sand fly fever occur together in Kamptee and that the virus cannot be demonstrated either by direct examination or by cultural methods, nor are guineapigs or rabbits susceptible.

Although the results of this investigation from the laboratory point of view were negative yet they are of value, and great credit is due to the author for carrying out so careful an enquiry in a Central Province station under trying conditions.

D H.

BABLET (J.). Typhus exanthématique et pseudo-typhus en Indochine. [Typhus and Pseudo-Typhus in Indo-China.]—*Ann. de Méd. et de Pharm. Colon* 1928. Oct.-Nov.-Dec. Vol. 28. No. 4. pp. 409-417 [17 refs.] [Summary appears also in *Bulletin of Hygiene*]

Typhus is endemic in Tonkin. Sporadic cases may be met with in all seasons, while in the cold season small epidemics may occur, but show little tendency to spread. The clinical symptoms correspond fairly closely to the text book description, though the rash is rarely seen in Annamites. Although the nervous symptoms are pronounced, the disease is fairly mild and the case mortality hardly ever exceeds 10 per cent. The agent of transmission is the louse. It is improbable, and the negative results obtained at the Saigon Pasteur Institute seem to prove this, that the virus of typhus can persist in Southern Indo-China where the climate is constantly hot and damp. The patients seen in Southern Annam by VERSIN and VASRAL had contracted the disease in Tonkin and the epidemic rapidly died out owing to lack of conditions favourable for its development. On the other hand the observations of NOC and GAUTRON at Saigon and of LAGRANGE at Nhatrang show that cases quite distinct from true typhus and resembling Japanese River Fever occur in the southern provinces. No case of this kind has been notified in Tonkin nor has one been seen by the author since January 1928. The best prophylaxis against typhus consists in carrying out general hygienic measures and individual cleanliness, and in raising the standard of comfort of the less favoured classes of the native population. [See also *Bulletin of Hygiene* 1927 Vol. 2, p. 453.]

J. D. Rolleston.

FLETCHER (William) LESLAR (J. E.) & LEWTHWAITE (Raymond). The Aetiology of the Tsutsugamushi Disease and Tropical Typhus in the Federated Malay States. Part II.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. June 25. Vol. 23. No. 1. pp. 57-70. With 2 charts in text. [16 refs.] [Inst. for Med. Research, Kuala Lumpur F.M.S.]

The authors are convinced that there are two types of tropical typhus in the Malay States distinguished from one another by (1) the Weil-Felix reaction, (2) Wilson's "agglutinabilis" reaction and (3) epidemiology.

In the first form the Weil-Felix reaction is strongly positive with the ordinary indol-producing strains of X19 such as No. 67 and the Warrar strain, and also the serum of the patients agglutinates Wilson's *B. agglutinabilis* whereas in the second form the Weil-Felix reaction is negative with these strains but positive with the Kinghorn strain of Proteus and Wilson's *B. agglutinabilis* is not agglutinated.

Epidemiology—The urban or W. form of tropical typhus (Bell's disease) occurs in towns and especially among shopkeepers where grain is stored, whereas the K. form is a rural disease and occurs among workers on plantations where secondary growth of weeds has occurred. This latter disease resembles in some ways Megaw's tick typhus and also tsutsugamushi disease.

An outbreak of this K. form, or "scrub-typhus," is described. About 30 cases were admitted to hospital, all coolies employed in

clearing secondary growth. The serum of all cases was tested and was found to agglutinate the K. type of *Proteus* in high dilution, but none of the sera agglutinated the W type or Wilson's bacillus. It is interesting to note that the cases of tsutsugamushi disease recently described by the same authors occurred on this same estate and the two diseases are obviously closely related.

These diseases are distinguished, however by the fact that in scrub-typhus the onset of the fever is sudden and the temperature drops by crisis about the tenth day whereas in Japanese River fever the onset is gradual and the temperature drops by lysis the chart resembling one of typhoid fever. They are also distinguished by the fact that a primary ulcer and bubo are found in tsutsugamushi disease but so far nothing of the kind has been found in scrub-typhus. The authors are of opinion that both scrub typhus and tsutsugamushi are carried by mites.

D H

OROYA FEVER AND VERRUGA PERUANA.

NOGUCHI (Hideyo) SHANNON (Raymond C.) TILDEN (Evelyn B.) & TYLER (Joseph R.) *Etiology of Oroya Fever XIV The Insect Vectors of Carrion's Disease.*—*Jl Experim. Med* 1929 June 1 Vol. 49 No 6. pp. 993-1008. (With 17 figs. on 3 plates (1 coloured) [10 refs.] [Rockefeller Inst. for Med. Research & Internat. Health Division Rockefeller Foundation New York.]

This is a continuation of Prof. Noguchi's work on the etiology of Oroya fever—it was commenced before this death and completed by the other authors.

TOWNSEND on epidemiological grounds was of opinion that Oroya fever and verruga were conveyed by Phlebotomi. The authors set out to prove this experimentally. Blood-sucking insects were collected in districts of Peru where verruga is common. These included ticks mites midges lice fleas bedbugs mosquitoes gnats and horse-flies and were despatched alive in sealed glass tubes kept in the refrigerator on the voyage. The method used was to grind up the insect in saline and inject the emulsion intradermally into monkeys.

The only insects which showed any evidence of the presence of *Bartonella* were Phlebotomi. Four lots injected into monkeys, although they produced no verruga lesions yet gave rise to fever in the monkeys and *Bartonella* was recovered from the blood in cultures. These cultures produced verrugous lesions when injected into other monkeys. Monkeys which had given positive cultures after injection of *Phlebotomus* emulsion were resistant to injection of other cultures derived from human cases and monkeys which had reacted to injection of cultures of *Bartonella* derived from human cases were resistant to cultures of the sand fly strain.

The authors therefore, conclude that the insect vector of Oroya fever (Carrion's disease) is a *Phlebotomus* and that the particular strain concerned is *P. noguchii* although *P. verrucarum* (Townsend) may also be concerned.

D Harvey

BATTISTINI (Telémaco S.). Contribución al estudio de la verruga peruana. II. Cultivo de la *Bartonella bacilliformis*. [Veruga Peruviana. II. Cultivation of *Bartonella bacilliformis*.]—*Facul. de Med. Lima*. 1927-28. Oct.-Mar. Vol. 10. No. 4-5-8. pp. 243-252. With 1 plate.

The author's technique for cultivating *Bartonella* is quite simple. A small drop of blood from the finger of the patient is withdrawn by means of a pipette into semi-solid medium (serum agar for example), the end is sealed in the flame and the whole placed in an incubator at 28° C. Colonies are visible in 5-6 days. The individual bodies are 0.6×0.2 microns to 1.6×0.5 microns—they are Gram-negative, markedly motile at the junction of medium and water of condensation, but flagella have not been demonstrated. In old cultures spicular forms are seen, from 7-30 microns in length. Growth will not take place in fluid media, only on solid or semi-solid, and under aerobiosis. Cultures had no action on any of 17 sugars tested. The reaction of the medium may be between pH 6.8 and 8.2, but the optimum is 7.4-7.6. A temperature of 56° C. destroys the organisms in 10 minutes, of 60° C. in 5 minutes. 1 per cent. formal, tricresol, or lysol in 10 minutes.

Whether in culture or blood they will not pass through Berkefeld filters V or N. In extracted blood they remain viable at 14 and 38° C. for 3 and 1 month respectively—in culture at laboratory temperature (22°-25° C.) they survive for 60 days, even though no precautions be taken to prevent the medium drying.

H. Harold Scott.

YAWS AND SYPHILIS

FIERA (Ernesto Ruberti) La framboesia in Somalia. [Yaws in Somalia.]—*Ann di Med Nav e Colon* 1928. Nov-Dec. Year 34 Vol. 2 No 5-6 pp. 321-332. With 12 figs. on 4 plates. [8 refs.]

A rather disjointed account of yaws as met with in Italian Somaliland and as described in various text books. Until recently yaws had not been differentiated from syphilis but it is now found to be widely disseminated in that country and presents the regular clinical picture of this affection. Cases of gangosa are met with but no case of goundou was seen. Juxta articular nodules are not referred to. In a few cases lesions were noted on the mucous membrane of the mouth and pharynx. Arsenobenzol is the remedy preferred 30 45 60 60 60 60 cgm. given at weekly intervals intravenously followed by a month on potassium iodide. For nurslings the treatment was given to the mother through whose milk the infant derived the drug.

H. S. Stannus.

MONTEL (L. R.) Le chancre pianique. Lésion primaire d'inoculation. [The Yaws Chancre.]—*Bull Soc Path Exot* 1928. Nov 14 Vol. 21 No 9 pp. 785-790 With plates 3-9 [Polyclinic, Saigon.]

A discussion upon the question whether there is such a thing as a primary chancre or lesion of inoculation in yaws and if so whether its characters have been truly recognized. The author points out how unconvincing are many of the descriptions given by many writers and finds little help in answering these questions from a study of the inoculation lesions obtained by SCHÖBL in monkeys. While in Cochinchina the author had the good fortune to see a number (56) of early cases of yaws and from his observations he answers both his questions in the affirmative and gives a series of photographs illustrating his points. He describes what he considers to be the normal evolution of the primary lesion and contrasts this with that of the primary chancre in syphilis concluding with the following table —

Syphilitic chancre	Framboesial chancre.
Non vegetating ulcer	Vegetating lesion.
Induration.	No induration.
Never more than 1 cm. in diameter	Always more than 1 cm. in diameter up to 5 cm
Situated almost always on genitals.	Generally situated on lower limbs.
Not inflammatory in character	Inflammatory in character
No pruritus.	Pruritus present always
Tendency to spontaneous cure	No tendency to spontaneous cure but rather to chronic ulceration.
Not modified by the occurrence of secondary lesions.	Modified by the occurrence of secondary lesions.
Cicatrix not apparent.	Cicatrix persists.

[Those interested in this subject will read the paper they will find possibly statements upon which opinions are not unanimous.]

H. C

von BÖLOW (T) Le contrôle du pian au Costa-Rica. [Control of Yaws in Costa Rica].—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21 No. 8. pp. 667-676. [2 refs.]

In 1924 some few cases about which Dr FALLAS had some suspicions were diagnosed by the author as yaws this being the first time yaws was recognized in Costa Rica. Since then evidence has accumulated to show that the disease is widespread in the canton of Osa to the south. Here the inhabitants consist of an aboriginal Indian population, ignorant, superstitious and living under poor conditions. An incidence of from 6 to 16 per cent was found in the various provinces. Primary lesions occurred on the lower limb in 87 per cent. on the upper limb in 12 per cent. In one case the incubation period is stated to have been three years that is between the date of last contact with possible yaws and the appearance of the initial lesion. The author believes that a tick *Amblyomma cayennense* plays an important part in transmitting the disease and thinks the virus may remain in the tick for many months. This suggestion is apparently based on the observation of a case of yaws which having been duly treated, six months later without so far as is known having come in contact with a case developed a florid secondary eruption. As he says, never does one see a recrudescence of the disease in cases properly treated. [There will be little doubt in the minds of readers that it was a recrudescence despite the treatment which was presumably that given as routine viz a total of 3.15 gm N A B. Eighteen per cent. of cases seen were in the primary stage. Thirty four per cent. showed secondary eruption, the remainder being classed as tertiary lesion cases including planter lesions 36 per cent. and bone pain 18 per cent. A single case of J.A.N. was observed among the total of 250 cases.]

The author gives a share in the spread of the disease to the plant *Sida rhombifolia* (N O Malvaceae) which abounds in the fields and about the paths. In the dry season the leaves fall and the sharp branches wound the feet and legs of each passer-by. The primary yaws lesions are found invariably on the outer side of the lower limbs. It follows that an important part of prophylaxis is to destroy the plant as far as possible and to keep the tracks clean.

H. S. S.

- i. FRANKLIN (E. Morris) Analysis of 4,473 Cases of Yaws.—*Gold Coast Rep. Med. & San. Dept. for Year ended Apr 1926-Mar 1927* Appendix B. pp 124-125.
- ii. BOASE (A. J.) Report on the Use of the Bismuth Salts in the Treatment of Yaws and Syphilis.—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended 31st December 1927* Appendix No. IV. pp 78-81.
- iii. ACHESON (J. A.) A Note on 2,279 Consecutive Cases of Yaws treated in the Kasempa District of Northern Rhodesia, 1926 and 1928.—*Northern Rhodesia Med. Rep. on Health & San. Conditions for Years 1925 & 1928* Appendix pp. 125-142. With 12 figs. on 6 plates.

i. Conclusions reached are to the effect that bismuth sodium potassium tartrate is a cheap efficacious easily administered remedy for yaws in $1\frac{1}{2}$ grain doses for adults with a total of 14 grains, given deep subcutaneously. Intramuscular injections are too painful and larger

dosage gives rise to stomatitis. It is non-effective in certain cases in which N.A.B. is useful and is not very efficacious in late yaws.

ii. In Uganda for yaws and syphilis the preparation above mentioned is preferred to bis. sod. tart. but it is used intramuscularly [the deep subcutaneous method not apparently being known] and is in consequence objected to by the natives. The length of treatment necessary to effect cure in yaws is unknown. N.A.B. is preferred for the initial injection to clear up a primary sore of syphilis.

iii. From observations made in the Kasempa district which lies to the extreme north west of Northern Rhodesia, 25 per cent. of the total population of 53 000 is estimated to have yaws. The disease is considered to have been endemic for generations. 2 279 cases were treated. At the same time 13 cases of syphilis were seen and so recognized by the sick themselves infection was obtained elsewhere. The incidence of gangosa has convinced the author that it is of frambœtic origin. The author states that contrary to the almost universal contention that the secondary granulomata do not or only exceedingly rarely affect mucous membranes a number of cases were found with the mucous membrane of the lips involved. [It is possible that these in reality did start on the skin and spread to the mucous membrane as later the author says he has seen this happen though in 11 cases 3 adults and 8 children lesions completely on the mucous membrane of the lip were noted. In 22 cases the nostrils were blocked but the lesions sprang from the muco-cutaneous junction lesions were common on labia but never seen on vaginal mucous membrane.] Skeletal pains were commonly complained of but glandular swelling was not seen unless associated with secondary infections. The excellent clinical descriptions given vary little from those of other observers. The pitting of the soles and palms and worm-eaten appearance was noted in some cases with secondary eruptions though more commonly seen later. Patchy leucoderma was also noted. J.A.N. were met with but rarely and only a single case of goundou. Satisfactory results were obtained with treatment by three intragluteal injections—4 grains each, of sod. pot. bis. tart. in 20 minims of water at 5-day intervals. Long standing lesions require longer courses of treatment.

H. S. S.

BARLOVATZ (A.) Sur le traitement du pian. [Treatment of Yaws.]—*Bull. Soc. Path. Exot.* 1928. Nov 14 Vol. 21 No 9 pp. 743-747

A record of results obtained in the treatment of yaws using different drugs in an attempt to find the optimum dosage and the minimal total amount of drug necessary to clear up the eruption. In short the results were as follows —

	Total Dosage cgm. per kg	Adult Dose	No of Cases.	Successes.
Stovarsol	6-10	3.6 to 6 gm.	14	8
Narsénol	2-4	1.2 to 2.4 gm.	8	0
Novarsenobenzol	1-1.5	0.6 to 0.9 gm	12	10
Acetylarsan (sol.)	8-10	4.8 to 6 cc.	12	8
Bi 36 salt	0.2-0.4	0.12 to 0.24 gm.	90	56
Biquinyl salt	0.8-1	0.48 to 0.6 gm.	6	5

[These results may however be of comparatively little value, as what should be aimed at is *cure* a point brought out in the discussion on this paper by MORTZEL.]

H. S. S.

SOLLING (A.) Il pian e il neo L.C.I. ["Two L.C.I." in Yaws].—*Arch. Ital. Sci. Med. Colon.* 1927 July Vol. 8 No. 7 pp. 396-399

The efficacy of "neo L.C.I." in the treatment of syphilis suggested to the author a trial of this compound in cases of yaws under his care in the Belgian Congo. The amount of the drug at his disposal being limited, only some ten cases were treated. In children, beginning with doses of 0.15 gm. subsequent injections of 0.3, 0.35, 0.45 up to 0.8 were given on alternate days either intramuscularly or intravenously according to age and until lesions cleared up. Complete healing of secondary lesions was often obtained after the second or third injection. Clinical cure is rapidly effected, toxicity is small, the solution is stable.

H. S. S.

VAN NISSEN (R.). Le traitement et la prophylaxie du pian au Congo belge. [Treatment and Prevention of Yaws in Belgian Congo].—*Bruxelles Méd.* 1929 May 23 Vol. 9 No. 30 pp. 581-585. (23 refs.)

After referring in brief to the high incidence of yaws among the natives of the Belgian Congo from 40 to 100 per cent. in many provinces the author passes in review the many substances which have been advocated in the treatment of the disease. Salvarsan and its homologues including sulpharsenol, he considers by far the most efficacious remedy provided the total dose is sufficient—up to 5 grams. Stovarsol is most useful for children. Bismuth salts have lost favour in many hands owing to the accidents which may follow their exhibition still they are of great value. Mercury finds no place in the treatment of yaws. Tartar emetic is slow and uncertain. Potassium iodide proves of value in tertiary cases. The necessity for well-planned anti-yaws campaigns is then pointed out and allusion made to the rather disappointing results obtained in some British colonies.

H. S. S.

HEINEMANN (H.) Bericht ueber 2 Fälle salvarsan-resistenter Frunboesie. (Mit einigen Bemerkungen zur Pathologie der Frunboesie) [Two Cases of Salvarsan-Resistant Yaws].—*Arch. f. Dermat. u. Syph.* 1928 Nov 9 Vol. 158 No. 3 pp. 577-582. With 2 text figs. (4 refs.)

The spectacular results obtained in perhaps the majority of cases of yaws treated with salvarsan preparations has in the past rather tended to confuse the real problem as to the dosage and length of treatment necessary to cure cases of yaws. Many observers have found considerable variation in the reaction of these cases to appendicals, and Dr Heinemann now records two cases in Javanese which were salvarsan-resistant. The first, a boy aged 7 years, received two injections of 0.2 gm. neosalvarsan, followed by four further injections without

improvement. He was then taken into hospital after eight injections the lesions were active treponemata were still present and the W.R.+++ The second case was a woman who after five injections of 0.45 gm neosalvarsan showed persisting active lesions. She also was taken into hospital and after the sixth injection still failed to respond.

The author refers to the experience of BAERMANN and quotes the figures of that observer given below in a table which shows the percentage of cases in various groups giving a positive W.R. after 1-3 treatments.

	Primary lesions.	Secondary lesions	Hand and foot lesions	Keratoses of palms and soles	Tertiary lesions
After one treatment	52	47	47	44	63
After two treatments	42	40	43	45	54
After three treatments	29	34	36	35	48

The second point of interest which the author deals with is the evidence for framboesial affections of the nervous system. Among 270 cases of yaws in all stages the W.R. reaction in the cerebrospinal fluid was negative in all. In a single case there was a pleocytosis and in a single case the gold sol reaction was positive. These cases may have been syphilitic. A case of paraplegia with positive blood W.R. in whom there was no history of syphilis but probably of yaws with a C.S.F. negative to all tests was considered to be due to syphilis. Another case of right hemiplegia and aphasia in an old yaws case showed a negative blood W.R. becoming positive under treatment with mercury and iodide but a negative C.S.F. This case would have been considered a typical syphilitic case in Europe but there was no history of syphilis and the author suggests that such cases need considering as possibly due to yaws.

H. S. S

TANABE (B) The Effect of the Administration of Alcohol upon the Result of the Wassermann Test in Yaws Monkeys.—*Philippine Jl Sci* 1928. Nov Vol. 37 No 3 pp. 247-250 [3 refs.]

The fact that the recent ingestion of alcohol may interfere with the result of a Wassermann reaction in human syphilis was demonstrated by CRAIG and NICHOLS in 1911 and subsequently confirmed by other observers.

The author working on Philippine monkeys experimentally infected with yaws now shows that a similar phenomenon occurs. The ingestion of 20 cc. of 48 per cent. alcohol by mouth or the parenteral administration of 3 cc. of 95 per cent. alcohol has caused the blood serum which gave a double plus W.R. before the alcohol to yield a negative W.R. 24-48 hours after the alcohol. After a further 72 hours this artificially induced negative reaction again became plus

H. S. S

DA SILVA (Francisco Venancio) O plan. [Yaws.]—*Boi da Saude M/da aos Indigenas* Louanda. 1929 Jan. Vol. 3. No. 1 pp. 1-7 With 7 figs. on 4 plates.

Some notes on cases of yaws as seen in the Congo with correspondence about the use of salicylate of bismuth in treatment. Among other things the author holds that yaws may be an inherited disease without saying how hereditary syphilis is differentiated. The photographs are quite undecipherable.

H. S. S.

LIVERKIN (L.) The Successful Treatment of Yaws with Intramuscular and Subcutaneous Injections of Myosalvarsan at the Hospital of the San Carlos Milling Company San Carlos, Occidental Negroes.—*J. Philippine Islands Med Assoc.* 1928 Aug. Vol. 8. No. 8 pp. 373-374 With 2 figs.

The author reports results of treatment in 33 cases of yaws at all stages which he considers are as good as those obtained with N.A.B. without the drawback connected with intravenous injection. No details mentioned.

H. S. S.

VIGNAROLI (Carlo) Contributo allo studio delle nodosità iuxta-articolari [Juxta Articular Nodules].—*Arch Ital Sci. Med Colon.* 1928 Aug. Vol. 9 No. 8. pp. 481-483. [Principessa Maria "Colonial Hosp Chaimale, Italian Somaliland.]

The author has noted cases of J.A.N. in Somaliland but they are not very common. After referring to the observations of some well-known authors he considers that his own cases suggest a treponemal etiology though none of them showed manifestations of syphilis.

H. S. S.

JEANSELMET, BURKIER & ELIASCHOFF Considérations sur un cas de nodosité juxta-articulaire survenu chez un syphilitique. [Case of J.A.N. in a Syphilitic].—*Bull. Soc. Française Dermat. et Syph.* 1928 June. No. 3. pp. 450-455. With 3 figs. [1 rel.]

A typical case of a single J.A.N. occurring on the nalar crest just below the olecranon in a man aged 34 years. No history of infection with syphilis (nor of yaws) but the W.R. was positive and there was a history of losses of consciousness during the war (1917) which ceased on anti-syphilitic treatment, and of acute articular rheumatism in 1918 possibly of syphilitic nature. Sections made from the nodule removed by operation showed the characteristic changes of the lesion. This case is therefore considered to be a case of J.A.N. of syphilitic origin (one more to add to the short list of such known cases which have been discussed in this Bulletin.)

SHARPE (W. Salisbury) Notes on a Case apparently identical with "Goundou" occurring in London.—*Trans. Roy Soc. Trop. Med. & Hyg.* 1928 Nov. 25. Vol. 22. No. 3. pp. 283-294. With 5 figs. on 2 plates.

A most interesting case originally under the care of Mr. E. D. D. DAVIS and shown by him at the Annual Congress of Laryngology and Otology in June. The case was recognized, however by Dr. Salisbury Sharpe as a condition apparently identical with goundou and was shown by him at the Royal Society of Medicine. A male aged 43, always resident in London.

with a history of syphilis (date not mentioned) and a positive W.R. The paranasal swellings are certainly characteristic of goundou [the case was seen by the reviewer at the Royal Society of Medicine] and they are associated with a sclerosing osteitis of the right mandible [resembling very much some of the cases described by BOTREAU ROUSSELL]. This is possibly the first case to be described in a white and the first such case having the clinical characters of goundou to be definitely ascribable to syphilis though the author refers to a case noted by CASTELLANI and CHALMERS as recorded by CANTILLI in a European—a unilateral case

H S S

BALFOUR (Andrew) A Condition resembling Goundou in a Pony—*Trans Roy Soc. Trop Med. & Hyg* 1928. Nov 25 Vol. 22. No 3 p 295 With 1 text fig

A note with a photograph, upon a circus pony about the size of a retriever dog, encountered as a fellow passenger on a steamer proceeding from Mauritius to Bombay. The previous history of the pony is unknown but it presented a swelling on either side of the nasal bones hard to touch, but which did not appear to incommode the animal in any way. The general appearance and character of these paranasal swellings suggest a condition analogous to goundou such as been described as occurring in apes and monkeys.

H. S S

SEQUESS (François) Un cas diagnostiqué goundou chez le gorille. [Goundou diagnosed in the Gorilla].—*Rev Méd et Hyg Trop* 1929 Mar-Apr Vol 21 No 2 pp 50-53 With 2 text figs [9 refs.]

The description of a male gorilla skull from Oubangui-Chari showing partly symmetrical bony hypertrophy resembling others which have been described and are referred to by the author. The salient features of the case are two masses of hard spongy bone approximately symmetrical situated on the malar portion of the superior maxillae resembling somewhat the tumour seen in goundou. A third osseous mass is present about the right occipital crest in front of the mastoid. Besides these tumours it is noted that there are thickenings of the bone about the orbital margin and the horizontal ramus of the mandible.

H. S S

HERMANS (E. H.) The Course of Syphilis in the Native.—*Acta Leidensia (Scholas Med. Tropicae)* 1927 Vol. 2 pp 96-110 [21 refs.] [Summary appears also in *Bulletin of Hygiene*.]

In the Dutch Indies according to Hermans primary and secondary syphilis are very rarely seen. This he thinks is not because the native does not seek medical advice since natives in districts well supplied with medical assistance seek advice for quite trivial lesions. In natives who develop a primary sore the secondary manifestations, unless stopped by treatment affect the skin and mucous membranes, glands and joints extensively and severely. Tertiary syphilis is the form commonly seen and KUYER has remarked respecting Soemba that the opinion is gradually gaining ground that what is diagnosed as tertiary syphilis may be tertiary yaws. Hermans thinks that extra-genital infection of children may possibly explain the lateness of the lesions seen in adults. Congenital syphilis is very uncommon in the Preanger where according to MULDER, 30 per cent. of the

population are syphilitic, Hermans saw only two cases of congenital syphilis in three years, and three other workers found none in 600 patients suffering from V.D. Neurosyphilis is very uncommon, but the author considers it is far more common in native soldiers who submit to modern treatment. The remainder of his paper is an argument to the effect that salvarsan and mercury especially the former administered in the earlier stages, so preventing a full inter-action between somatic tissues and virus, predisposes to tabes and G.P.I. Consequently he favours a more or less *laissez faire* policy in the early stages. [The author seems to ignore the fact that in the history of large numbers of cases of tabes and G.P.I. there is practically nothing of treatment and in great numbers more the treatment has been by mercury administered orally for a few weeks or months. He bases his views on the fact that in the few cases he has seen the treatment has been more strenuous and with salvarsan and mercury. He seems to ignore the social conditions under which the cases had lived. These, judging by the accounts approached those of European civilization more closely than did those of natives not in Government service.]

L. W. Harrison.

FERRUCCIO (Cotta Ramusino). La sifide cutanea in Somalia. [Cutaneous Syphilis in Somalia.]—*Arch. Ital. Sci. Med. Colon.* 1928. Dec. Vol. 9 No. 12. pp. 735-742. With 3 text figs.

Referring to the heavy incidence of syphilis among many native races the author believes it to be the chief factor in their destruction. Dealing with the congenital disease he points out that symptoms may be delayed until maturity when tertiary lesions appear in attenuated form affecting skin, mucous membrane or bone or later the viscera. Naso-pharyngeal ulceration with destruction is common, as are also similar destructive lesions of the vault of the skull. Syphilitic hepatitis is probably not uncommon and more rarely cardio-vascular lesions, lesions of the lung and genito-urinary tract, but tabes general paralysis and transverse myelitis are practically unknown.

The acquired disease presents a clinical picture resembling that seen among whites but the primary and secondary lesions are not often seen owing to the native's indifference. Rupia and ulcerative skin lesions at the end of the secondary period, however are more commonly seen sometimes with high fever and more rarely with affection of liver spleen and bowel. The differential diagnosis is often difficult from yaws tropical and other forms of ulcer.

H. S. S.

ARAUJO (Oscar da Silva). Alguns commentarios sobre a syphilis no Rio de Janeiro. [Syphilis in Rio de Janeiro.]—92 pp. With 34 figs. on 14 plates. 1928. Rio de Janeiro. Empresa Graphica Editora—Paulo Pongetti & Cia. Avenida Mem de Sá, 67-78.

In the first half of this brochure Dr. Araujo surveys firstly the evidence for and against the presence of syphilis in South America before the Columbian epoch, and sums up in favour of the view that the disease was introduced from Europe by the early pioneers who crossed to the southern continent subsequent to the discovery of America. He then traverses the literature in regard to descriptions of the disease by early writers in Brazil, and the

causes which made for its spread in Rio a city whose population started with a nucleus of traitors and others banished from their own countries the dregs of Brazil, to which were added some cargo-loads of undesirable women. Indeed at that time the country harboured and gave guaranteed shelter to all the criminals who found their way there except those accused of "heresy, treason, sodomy and forgery."

In the second half of his work the author deals with the clinical disease as now encountered. Analysing his cases of primary genital chancre the site was as follows: balano-prepuceal sulcus 190, outer surface of prepuce 185, inner surface of prepuce 125, frenum 157, glans 73, meatus 22, scrotum 4, intra urethral 2. Extra genital chancres have been said to be very common. In Rio they formed in a year (1916) 9-10 per cent. and are more frequently seen in whites than coloured people. The differential diagnosis of the extra genital chancre from leishmaniasis is not always easy, the points in favour of chancre being a single lesion with regional gland involvement, together with of course a positive W.R. and reaction to anti-syphilitic remedies. Primary lesions were seen at all ages from 9 to 70 years but the majority occur in males between the ages of 17 and 30 with highest incidence between 20 and 25 years. Clinically with the exception of some minor points syphilis in Rio resembles the disease as seen in colder climates. The incubation period would appear to be shorter in many cases only 8-10 days. A roseola is not often distinguished but papulo-lenticular and squamous eruptions are common. Pustular and acneiform lesions are relatively rare compared with the incidence in other hot countries. Mucous plaques about the lips are uncommon, but condylomata about the anus and in the axilla very frequent. Alopecia is rarely seen and the same is true of onychia and perionychia. Bone and joint pains are often complained of, perhaps not more frequently than in other countries but probably earlier in the disease. Tertiary skin and bone lesions are uncommon in Rio at the present time owing to treatment having been instituted but such lesions are seen in those coming into the city from outlying areas. Tabes and G.P.I. would appear to be not much less common in Rio than in European cities but these diseases do not occur in native races in distant provinces. Infection from white or coloured women appeared not to be a decisive factor in determining onset of these diseases. Other types of neurosyphilis are common. More remarkable however is the widespread and early incidence of cardio-vascular disease in syphilitic infection. Signs of a generalized affection of the vascular system is often seen within a few weeks and within a year aortitis and myocarditis. Among the coloured people syphilis is said to be characterized by annular framboesiform, keloid eruptions and juxta-articular nodules. Some 100 cases of the latter condition were met with of undoubted syphilitic origin. A series of photographs illustrate very well many of the conditions described, including the eruptions *sabre tibias* the condition known as *gangosa*, J.A.N. (here reproduced) etc.

H. S. S.

COOK (Albert R.) *The Treatment of Ante-Natal Syphilis.*—*Kenya & East African Med. J.* 1929 Apr. Vol. 6, No 1 pp 12-18.

In a paper given in Uganda Dr Cook advances a strong plea in favour of the use of mercury in the treatment of *latent* syphilis in pregnant native women in Uganda. The stock mixture contains 1/48 grain hydrarg. perchlor. per dose taken thrice daily. It is claimed that it is effective, cheap, readily taken by natives and without injurious effects. Women who have before had many miscarriages for the first time bear healthy children. [No statistics given.] Dr Cook says there is no doubt that between 1897 and 1907 the incidence of

five cases gave a positive L.I. reaction, and all showed evidence of previous inguinal lymphadenitis. On the other hand, as tested by Ducrey's antigen ulcer molle bubo appears to play an unimportant rôle contrary to previously expressed opinion. Whether syphilis also is a factor is uncertain, though the co-existence of venereal infection is common. Tuberculosis plays no part.

H. S. S.

- ALBUQUERQUE (M. J. Cavalcanti) Aspectos regionais e prophylaxia das doenças transmissíveis devidas a espiroquetas. A boubã na Parahyba.—*Archivos de Hig. Rio de Janeiro*. 1928. May Vol. 2. No 1 pp. 65-78. English summary facing p 78
- BOSE (A. J.) Report on the Use of the Diamuth Salts in the Treatment of Yaws and Syphilis.—*Annals & East African Med. J.* 1929 Mar Vol. 2 No 12 pp 400-405
- WEIR (H. C.) A Note on the Value of "Solita" in the Treatment of Yaws.—*West African Med. J.* Lagos. 1929 Apr Vol. 2. No 4 pp 185-186

CLIMATIC BUBO.

- i. NICOLAS FAVRE & LEBEUF Lymphogranulomatose inguinale opérée présence de ganglions iliaques suppurés, macroscopiquement semblables aux ganglions inguinaux. [Granuloma Inguinale with Large Iliac Glands].—*Bull. Soc. Française Dermat. et Syph.* 1929 Apr No. 4 pp. 287-288 (R.L. pp. 243-244).
- ii. GATÉ (J.) & MICHEL (P.) Un cas de maladie de Nicolas-Favre bilatérale avec très grosses adénopathies iliaques et accident primitif ulcéreux atypique.—*Ibid* pp 289-291 (R.L. pp. 245-247).

1. Report of a case of climatic bubo exhibiting typical left inguinal adenopathy without fistulation associated with masses of enlarged iliac glands on each side. The inguinal mass was removed by operation, as also two glands from the left iliac region per the inguinal canal. Both sets of glands on section were typical and showed softening and abscess formation. The interest in this communication lies in the fact that it is shown that changes in the iliac glands may resemble those in the inguinal groups, that spontaneous disappearance of the remaining iliac glands may take place confirming the observation of Nicolas and Favre that such disappearance does take place after removal of the affected inguinal glands. [It would seem fair to argue from this observation, inasmuch as it has not been shown that the iliac masses persist if the inguinal glands are not removed, that operative interference should be unnecessary for the inguinal masses, and would further favour HANSCHELL's method of treatment.]

ii. Report on a second case with double inguinal adenopathy with fistulae and enlargement of iliac groups.

H. S. Stanner

- KITCHEVAITZ (Milan) Un cas de réinfection ou superinfection probable de la maladie de Nicolas-Favre. [A Case of Climatic Bubo with Probable Reinfection or Superinfection].—*Bull. Soc. Française Dermat. et Syph.* 1929 Mar No. 3 pp. 173-178. With 1 text fig. [Dermo-Syph. Clinic, Faculty of Med., Belgrade.]

The author relates in detail the case of a 26-year old male who, in August 1928 suffered from a left inguinal adenopathy having the characteristics of climatic bubo but unassociated with any genital lesion. Treatment by

incision was followed ultimately by complete healing at the end of ten months (i.e. June 1927) but there persisted a thickening in the scar the size of a filbert nut. In August 1928 the patient presented himself with a double inguinal adenitis preceded by two small superficial lesions on the prepuce and later accompanied by marked general symptoms. Specific intradermal reactions for climatic bubo were strongly positive for soft sore mildly positive due doubtless to a previous infection. There was no evidence of syphilis or gonorrhoea.

The author in discussing the case thinks that the more rapid evolution of the second attack, the marked general symptoms and the very marked cuti reaction point to either a superinfection or a reinfection in a person who has been sensitized by the previous attack.

H. S. S.

NICOLAS (J.) LEBEUF (F.) & ROUSSET (J.) A propos de l'inoculabilité expérimentale de la maladie de Nicolas-Favre le pseudo-chancro d'inoculation. [Experimental Inoculability of Climatic Bubo]—*Bull. Soc. Française Dermat. et Syph.* 1929 Apr No 4 pp. 320-322 (R.L. pp 276-278) [1 ref.]

These observers having repeated the experiments of J. A. G. PRIETO carried out in Madrid find that the lesion produced by inoculation of a guinea-pig with a portion of gland tissue from a case of climatic bubo is not in truth of the nature of a lymphogranuloma but merely an abscess of elimination, and that the accompanying glandular enlargement is in no way histologically akin to that disease and that in fact similar results may be obtained by inoculating control animals with any kind of tissue. This disease is so far non-inoculable into animals.

H. S. S.

FISCHL (Friedrich) Lymphogranulomatosis inguinalis. (Paradenitis.) [Lymphogranuloma Inguinale]—*Seuchenbekämpfung* Vienna. 1929 Vol. 6. No 2. pp 104-110 [4 refs.]

A general résumé of our knowledge upon this condition which, originally described from the tropics is being recognised all over the world.

Donovan bodies were not discovered, but the lesions often showed a contaminating spirochaete which disappeared after a few tartar emetic injections. [No mention is made of the fusiform bacillus. It seems possible that the good results obtained in the 20 per cent. of cases were due to the effect of the emetic on a condition allied to the ordinary tropical ulcer rather than on a lesion due to yaws or syphilis (treponematosis).]

H. S. S.

GRANULOMA VENEREUM.

KALTHOFEN (A.) De bestrijding van het Venereisch Granuloom onder de Kaja Kajas van Nederlandsch Zuid Nieuw Guinee. [The Combating of Granuloma Venereum among the Kaja-Kajas of Dutch South New Guinea.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1928. Vol. 68. No 5 pp 740-752. With 1 sketch map & 9 figs. on 4 plates [11 refs.]

The Kaja Kajas are the aboriginal Papuans of South New Guinea. Their primitive habits (clan system low level of family life lack of respect for the female, separation of the sexes and the housing of the

boys in dormitories) have led to sexual and homosexual extravagances unknown elsewhere. The Kaja Kaja population therefore constituted a very fertile soil for any venereal disease imported. The author thinks that granuloma venereum must have been fairly recently introduced, and cannot believe that it has existed for a long time in sporadic form. He rejects with indignation the opinion that the European should be held responsible for the epidemic which has raged since about 1915. He holds that Papuan native dancers from British New Guinea transmitted the disease, after the Dutch government had established order and peace among the Kaja Kaja tribes.

A short clinical description of the disease is given with good illustrations and the geographical distribution is recorded. The combating of the epidemic is carried out in a few (at present seven) simple hospitals, where the patients are treated with a standard cure consisting of three intravenous injections weekly of 10 cc. freshly prepared 1 per cent solution of tartar emetic. As a rule, after about 25 injections the disease is cured—relapses are fairly common.

By this campaign supported by government regulations aiming at the establishment of better social, economical and moral conditions, and by the R. C. mission, which is especially taking care of the children, the spread of the disease is much reduced and now easily kept within reasonable limits. Only that part of the country where primitive conditions still exist is seriously affected.

W. J. Bala.

IRIARTE (David R.) & SALAS (Luis M.) Granuloma venereo. (Granuloma venereum).—*Gac Med. de Caracas*. 1928. July 15 & 31. Vol. 35. Nos. 13 & 14. pp. 204-208 212-216. [57 refs.]

This contribution made to the 5th Venezuelan Medical Congress is virtually a text book article in Spanish on G V with a very far bibliography. The author deals with the disease historically and clinically touches on the pathology and the unsettled question of etiology. Treatment is practically confined to the use of tartar emetic. He points out that this affection is much more widely distributed than often supposed and that the differential diagnosis, especially in mixed infections, is often difficult. In the latter part of his article he cites in some detail four cases coming under his own notice.

H. S. Stammes.

GIGLIOZI (George) Granuloma venereum—its Diagnosis and Treatment. Notes on Fifteen Cases treated with "Stibonyl" Heyden in British Guiana.—*Jl Trop Med. & Hyg* 1928. Oct. 1. Vol. 31. No. 19. pp. 245-254. With 12 figs. on 2 plates.

The interest of the paper lies in the advocacy of stibonyl Heyden in the treatment of this affection. Used with little effect by THURGOOD and TAYLOR in G V and adversely reported upon by a number of authors when given in leishmaniasis, the present author finds it efficient, safe and effective in antimony-resistant cases. The following is recommended—Two courses each of seven intravenous injections with an interval of forty five days between the courses, each course consisting of gramma 0.1 0.2 0.3 0.4 0.5 0.6 0.6 dissolved in 20 cc. of normal saline prepared with distilled water the first two doses on successive days, the following on alternate days.

H. S. S.

DELANARE (G) & GATTI (C.) Granulome péréal en plaques.
[Perianal Granulomata.]—*Bull Soc. Path. Exot* 1929 Mar 13
Vol. 22. No. 3 pp 148-150 With 1 text fig

The author records the case of a male Paraguayan, aged 22 who three weeks after sexual intercourse with a woman not known to be affected developed symmetrical ulcerative granulomatous plaques on the inner surfaces of the nates about the anus. The secretion contained no leishmania nor fungus, but on the other hand, Calymmatobacterium occurs in masses together with a few *B. fusiformis* and *B. spuligenum* and many spirochaetes of refringens-balantidis and microdentium type a few closely resembling *T. pallidum*. Inoculation into a monkey was negative. Treatment by cyanide of mercury and salicylate of bismuth internally and local applications of sub-nitrate of bismuth determined the disappearance of all spirochaetes but no change occurred in the granulomatous plaques until the exhibition of tartar emetic by the intravenous route. After one course relapse occurred, but cure was established after a second series of injections.

H. S. S.

HANSCHKE (H. M.) Treatment of Granuloma Pudendi by Antimony Potassium Tartrate in Glucose Solution and by Protein Shock.—*Trans Roy Soc. Trop Med. & Hyg* 1929 Jan. 30 Vol. 22 No 4 pp 391-394 [1 ref.]

The author's own summary of this interesting case is given below —

1 The ulceration of granuloma pudendi occurring in a young previously healthy white man extended steadily in spite of various therapeutic measures including intravenous injections of antimony potassium tartrate in normal saline solution.

2 Those injections caused more or less severe shoulder pains.

3 Three months after the appearance of the ulcer and when it was still extending intravenous doses of T.A.B. vaccine and at the same time now larger intravenous doses of antimony potassium tartrate—but dissolved in 5 per cent glucose solution—promptly stopped extension of the ulcer and promptly induced healing.

4 The writer's clinical experience of the quick initiation of healing of various acute and chronic inflammations and ulcerations by intravenous dosage with T.A.B. vaccine leads him to conclude that in this case the immediate induction of healing was mainly due to the T.A.B. intravenous protein shock.

5 Healing continued rapidly under intravenous injections of antimony potassium tartrate in 5 per cent. glucose solution alone and towards the end, under stibamine glucoside intravenous injections alone and was complete in twenty two days.

"6 It is noteworthy that no pains followed on intravenous doses of antimony potassium tartrate in 5 per cent. glucose solution, in the same patient who had experienced pains two months previously when given intravenously much smaller (though more closely repeated) doses of antimony-potassium tartrate in normal saline solution.

"7 The glucose solution apparently decreases the toxicity of the antimony drug and may perhaps increase its therapeutic powers.

8. Probably also it protects the liver cells from the fatty necrosis which the larger doses of antimony cause—a proposition based by analogy on the experimental laboratory observation and the well-known clinical experience that glucose protects the liver cells from the fatty necrosis caused by arsenic and especially by arsenobenzol compounds.

9 Glucose apparently permits of larger doses of antimony. This has a bearing on a far larger part of the field of tropical medicine (too well known to be specified) than is comprised by granuloma pudendi.

"10 Though it is to digress yet it is not altogether irrelevant, to point out that glucose protects the liver cells from the fatty necrosis caused by chloroform carbon tetrachloride is now extensively used in tropical human and veterinary medicine. Clinical observation and laboratory experiment have established that this drug causes fatty necrosis of liver cells and DAVIS (1929) has shown that carbohydrate diet protects the liver from this harmful effect of carbon-tetrachloride. Obviously then glucose should be administered with that drug

H. S. S.

DELMARE (G.) & GIACINI. Granuloma inguino-acrotal à forme d'ulcère rubané. (Granuloma Inguinale in Form of Ribbon-like Ulcer).—*Bull. Soc. Path. Exot.* 1929 Jan. 9 Vol. 22, No. 1 pp. 19-22.

The report on a case of granuloma inguinale which had existed 7 years, and in which the process had spread in ribbon fashion over the scrotum and inguinal region. With 80 cgm. of tartar emetic (by intravenous injection of 5 and then 10 cc. of a 1 per cent. watery solution) cicatrization was obtained in 15 days.

H. S. S.

DE ALMEIDA (Eurico). O stibosan e o granuloma venereo. (Phagedenismo de MacLeod Donovan.) (Granuloma Venereum treated with Stibosan).—*Bol. da Assoc. Méd. aos Indígenas.* Louisa, 1929 Jan. Vol. 2 No. 1 pp. 60-62.

Reports the first case of G V noted in Angola. Treatment with Heyden 471 "resulted in complete healing in fifteen days.

H. S. S.

GAGE (I. M.). Granuloma Inguinale. Preliminary Report on the Culture of the Donovan Body.—*Arch. Dermat. & Syph.* 1929 May Vol. 19 No. 5 pp. 784-788. With 3 text figs. [9 refs.] (Dept. of Surgery Tulane Univ. New Orleans.)

The author has, he claims, succeeded in cultivating from a case of granuloma inguinale an organism having all the morphological and staining characteristics of the Donovan body as seen in smears made from the lesion, thus confirming the work of some eight other investigators. Using this organism Koch's postulates have never been fulfilled and the etiological relationship to the disease remains unproved.

H. S. S.

CASTELLANI (Aldo) & MENDELSON (R. W.). Remarks on the so-called "Cultures of Donovan Bodies."—*Jl. Trop. Med. & Hyg.* 1929 June 1 Vol. 32 No. 11 pp. 148-149.

The results of investigations by these authors are epitomized as follows. In practically every case of G V [numbers not stated] Donovan bodies were found in scrapings. A capsulated bacillus resembling *B. lactis aerogenus* was obtained on culturing the organism from a maltose agar culture when stained resembles the Donovan body. Inoculation of cultures into laboratory animals and human beings produces an abscess, but not G V. Vaccines prepared from the organism are useless. Donovan bodies are considered to be like Proteus x19 in typhus, "nosoparasites"—not the true causative organism but one so constantly associated as to have a diagnostic value.

H. S. S.

REVIEWS AND NOTICES

MENSE (Carl) *Handbuch der Tropenkrankheiten*. [Manual of Tropical Diseases.] 3rd Edition. Vol. 5 Pt. 1—pp xi+846 With 362 text figs. & 2 folding & 4 coloured plates. 1929 Leipzig Verlag von Johann Ambrosius Barth. [Paper Rm. 90 Bound Rm. 94]

In this volume, Helminthology (Georg STICKER, with Wilhelm SCHÖFFNER & N. H. SWELLENGREBEL) is covered in 423 pages, relapsing fever and other spirochaetoses (Heinrich RUGE) in 248 Chagas disease (Carlos CHAGAS Eurico VILLELA & H. DA ROCHA LIMA) in 50 and yellow fever (Miguel COUTO & H. DA ROCHA LIMA) in 67. An appendix by the Editor (27 pages) deals with little known diseases.

The worm section deals with geographical distribution and development, with hosts other than man—and here *Ancylostoma brasiliense* is credited to the cat but not to the dog, with habitat and damage done and with the description of worm eggs. This section contains an excellent reproduction of LOOS's well-known plate of worm eggs in which the egg of *Trichostrongylus colubriformis* as the species is properly named on p 336 is described as that of *Strongyloides subtilis*. Methods of mass diagnosis for hookworms by finding eggs are described. If the reviewer's D.C.F. is faithfully carried out as advised on p 90 in the book, it can fairly be guaranteed that eggs will be missed in all but exceptional cases. Stoll's and Willis's methods are equally inaccurately described. A consideration of anthelmintics follows and after that the worms are dealt with in detail. Infections are arranged zoologically by their agents, with little indication as to their importance to man. In outstanding type the name of the human lung fluke is given as *Paragonimus westermani* and later as *Paragonismus* the broad tapeworm has no less than five variants the old world hookworm is nearly always referred to as *Ancylostoma duodenale* but once correctly as *Ancylostoma*. The objection to following the Rules of Zoological Nomenclature here is mentioned, but not the ruling under them (Opinion 86 of February 1915) which should settle the matter. Under ankylostomiasis concentrative methods are again considered and again D.C.F. is so described as to make good results from it impossible while the curious Ersatz for it which was tested in FÖLLKORN's laboratory is quoted as if it were of value in estimating the worth of the technique properly carried out. Ankylostomiasis is fully considered, ascariasis and threadworm infection shortly.

After a section on the leeches follows that on relapsing fever and here as throughout the book, the illustrations which include coloured plates are very striking. The literature, though copious, is uneven in including recent work. The book (unbound) in spite of care has come to pieces in the reviewer's hands.

Clayton Lane.

PEKING UNION MEDICAL COLLEGE. *Laboratory Manual of the Division of Bacteriology*. Prepared under the Direction of C. E. LIM.—154 pp. With 2 text figs. 1929 P.U.M.C. Press, Peking, China. [\$1.50] [Review appears also in *Bulletin of Hygiene*.]

This little book of one hundred and fifty four pages describes the methods which are employed in the Division of Bacteriology of the Peking Union Medical College. It is the outcome of practical experience involving the examination of over thirty thousand specimens a year. As the author states in his preface, it is merely a guide to laboratory methods and does

not discuss their principles, value, limitations or clinical application. It describes them clearly and accurately and embraces all those usually employed in a bacteriological laboratory. It is evidently not the function of the particular division to undertake the examination of blood or spleen smears for parasites of malaria or kala azar or of faeces for protozoa, for no reference is made to the methods involved. Similarly the technique of blood counting does not find a place though that of blood grouping is dealt with. These omissions are evidently intentional, but had these subjects been included the book would have had a wider appeal, for many bacteriological laboratories have to undertake such examinations.

As regards criticisms, few can be made. It is possible that when material is to be examined for predominating organisms the necessity of studying a stained smear in addition to making cultures might have had greater prominence while the standardisation of vaccines by the opacity method might have been mentioned in place of the cumbersome and inaccurate counting of organisms, which, however, is still adhered to by the majority of bacteriologists.

The methods described are clearly set forth in numbered stages, so that users will experience no difficulty in following the technique. Owing to the fact that in Peking laboratory animals cannot be purchased, special arrangements have had to be made for breeding and a section of the book is devoted to a description of the methods which have proved to be satisfactory. The information will undoubtedly be of value to other laboratory workers who are similarly placed.

The book closes with a good index and though applying particularly to work in Peking will certainly prove very useful in any bacteriological laboratory.

C. M. Weyen.

MACKENZIE (John) [M.A. M.B., Ch.B. D.P.H. Lieut.-Col., Royal Army Medical Corps.] *Army Health in India. Hygiene and Pathology*—With a Foreword by Lieutenant-General Sir Mathew Fell [R.C.B., C.M.G., F.R.C.S. K.H.P. Director-General, Army Medical Services.]—pp iv+158. With 6 diagrams, 9 figs., 3 plans & 2 maps. 1929. London. John Bale Sons & Danielsson, Ltd., 83-91 Great Titchfield St. W 1 [10s. 6d.]

Colonel Mackenzie says in his preface that the history of the evolution of preventive medicine in the Army in India has not, so far, been written. Many will have read his articles in the *Journal of the Royal Army Medical Corps* but it is pleasing to find them collected into book form. This small book might well be prescribed as compulsory reading for any officer proceeding to India on a first tour of military medical service.

J. F. C. R.

TROPICAL DISEASES
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[No. 11]

AMOEBIASIS AND DYSENTERY

AMOEBIASIS.

WILLIAMS (L. H.) WILDMAN (O.) & CURTIS (Lee F.) *Amoebiasis in Haiti*.—*U.S. Nav Med Bull* 1929 Apr Vol. 27 No 2. pp 331-335 [3 refs.]

The negro population of Haiti are carriers and without idea of sanitation, and amoebiasis is endemic and widespread. Children become infected even before weaned from the breast. Over a 2 year period the records of the laboratory showed 16.26 per cent of *E. histolytica* infection in hospital patients—examination of specimens without and with use of Lugol's solution. Latterly on adopting Craig's sedimentation of cysts technique 42.8 per cent. positive cysts have been obtained (42 specimens.) This technique gave —

Among 50 members U.S. Marine Corps in Cape Haitien Barracks 5 per cent. *E. histolytica* 5 *E. coli* 10 *Giardia lamblia*

Among 50 native gendarmes in barracks, Cape Haitien 44 per cent. *E. histolytica*, 51 *E. coli* 13 *Endolimax nana* 5 *Iodamoeba bütschlii* 19 *Chilomastix mesnili* 25 per cent. *Giardia lamblia*

Ascaris lumbricoides ova were found in 5 per cent. of the Marines and in 50 per cent. of the gendarmes. Hookworm ova in no marine and in 17 per cent. of the gendarmes

In spite of 5.8 per cent. of acute amoebic dysentery in hospitalized native patients amoebic abscess of liver is strikingly rare. The authors have encountered only one such case diagnosed apparently on clinical grounds only cured by medical treatment.

In treatment of dysentery emetine hydrochlor has been only partially successful. Yatren by mouth and by enemata proved more successful in relieving pain and eradicating vegetative and encysted amoebae but it caused such severe diarrhoea that in many cases it had to be withheld and emetine given instead. Paroxyl (p-oxy-m-acetylaminophenylarsenic acid) proved of greatest value, especially when given with bismuth subnitrate. Its dose is a 4 grain tablet three or four times daily bismuth subnitrate one teaspoonful in water four times daily. One fairly severe case of arsenical poisoning [? dermatitis ? jaundice] occurred intravenous sodium thiosulphate was quickly effective. Rest in bed is not essential but advantageous in the acute stage.

H. M. Hanschell.

WILLIAMSON (Charles Spencer) KAPLAN (Bertha) & GEIGER (J. C.).
A Survey of Amoebic Dysentery in Chicago.—*Jl. Amer. Med. Assoc.* 1929 Feb. 16. Vol. 92. No. 7 pp. 528-531 [College of Med., Univ. of Illinois, & Dept. of Health, Chicago.]

This investigation followed on the recognition of cases of amoebic dysentery among the staff of a hotel.

1. Protozoa found in 1148 Food Handlers.

<i>Endamoeba histolytica</i>	27 carriers	..	2.35 per cent.
	(2 active cases)		
<i>E. coli</i>	220 carriers		19.18 "
<i>Endolimax nana</i>	23	..	2 "
<i>Iodamoeba butschlii</i>	61	..	5.31 "
<i>Trichomonas intestinalis</i>	21	..	1.82 "
<i>Chilomastix mesnili</i>	22	..	1.91 "
<i>Giardia intestinalis</i>	75	..	6.53 "

2. Parasitic infections among 380 other Normal Persons taken at random.

<i>E. histolytica</i>	4 carriers	..	1.05 per cent.
	(2 active cases)		
<i>E. coli</i>	31 carriers		8.10 "
<i>Endolimax nana</i>	3	..	0.78 "
<i>Iodamoeba butschlii</i>	7	..	1.88 "
<i>Trichomonas intestinalis</i>	4	..	1.05 "
<i>Chilomastix mesnili</i>	6	..	1.57 "
<i>Giardia intestinalis</i>	7	..	1.88 "
<i>Trichuris trichiura</i>	4	..	1.05 "
<i>Oxyuris vermicularis</i>	2	..	0.52 "
<i>Taenia saginata</i>	2	..	0.52 "

H. M. H.

TER POORTER (F. H.) Beitrag zur Kenntnis der Darmprotozoen in den Niederlanden, insbesondere der *Endamoeba histolytica*. [Intestinal Protozoa in the Netherlands, especially *E. histolytica*].—*Cent. f. Bakt. I. Abt. Orig.* 1928. Dec. 4. Vol. 109. No. 7/8. pp. 406-416. With 1 chart in text. [20 refs.]

This paper gives the results of a long and careful investigation. The author recounts, and tabulates the findings, investigations by various workers since 1914 in Germany, England, France, Holland, into the incidence of *E. histolytica* infections in those countries, all of which have received review in this *Bulletin*. He remarks that for 100 years Holland has been in regular contact with the tropics, giving continual importation of *E. histolytica* from the tropics. He has investigated its incidence in Holland in apparently healthy persons only; his findings are classified, analysed and set out in tabular form. His technique is carefully set out and the morphology of the amoebae found is discussed. As example, one set of findings may be given. The stools of 469 apparently healthy naval men (petty officers, seamen and stokers) returned to Holland after service in the squadron in the Dutch East Indies, were examined, between December 1925 and March, 1927.

Infected with <i>E. histolytica</i>	..	..	..	43
" " <i>E. coli</i>	..	..	..	60
" " <i>E. tenax</i>	..	..	..	12
" " <i>E. nana</i>	..	..	..	62
" " Iodocysts	..	..	..	30
" " <i>Lamblia intest.</i>	..	..	..	31
" " Blastocysts	..	..	..	122

The author notes that English workers do not recognize *E. tenax* as a separate species but describe it as a small strain of *E. histolytica*. The fleet base in the East Indies is Soerabaja where to-day there is not much amoebic dysentery. In Batavia FLU (1919) found 10.5 per cent and BRUG (1920) 12.7 per cent. of the inhabitants not suffering from bowel disease to be carriers of *E. histolytica*.

H. M. H.

REVUE DE MÉDECINE ET D'HYGIÈNE TROPICALES | 1929 May-June. Vol. 21 No 3 (Numéro consacré à l'amibiase)
[Amoebiasis] [TRABAUD PANAYOTATOU PETRIDIS
LECERCLE TRABAUD & SABBAGH ABD EL KADER EL SABBAGH,
KHOURI]

Eleven papers. Two on intestinal and appendicular and one on hepatic amoebiasis. They are interesting but break no new ground. Seven papers chronicle mostly with enthusiasm the respective authors' sincere belief in certain other forms of amoebiasis viz.—latent amoebiasis amoebic haemia, amoebic bronchitis amoebic tonsillitis amoebic peritonitis, and cite clinical cases in claimed support which in fact give no real grounds whatever in support of the diagnosis. The antiseptic that may check this ferment is in the last paper. Had it been the first the rest could hardly have been published with it.

In this Dr J. KHOURI of Alexandria writes on *Quelques considérations sur l'amibiase en Egypte*. His paper is of great interest and great service. He had already recorded the very great decrease in cases of amoebic dysentery and liver abscess in Egypt since the introduction of emetine therapy and that as in other countries dysentery was the most common morbid manifestation of infection with *Entamoeba histolytica* and *E. minuta*. He notes that since 1923 records have appeared, with increasing frequency of infection of bladder kidney lungs with the dysentery amoeba, especially in Alexandria. During 25 years up to 1924 in Egypt he has examined among 50 000 urines that of 591 patients with haematuria (bilharziasis filariasis calculus). In 4 per cent. only did the etiology remain obscure. For the last 5 years in Alexandria he has looked out especially for cases of vesico-renal and pulmonary amoebic infection. For example in 2 haematuria cases the diagnosis of vesical amoebiasis ('*A. histolytique*') has been made after a microscopical examination of the urine. In neither the fresh nor centrifuged urine of either case has he found any amoebae. One was a case of neoplasm (confirmed by radioscopy) and the other bilharziasis. In this last emetine therapy was followed by clinical improvement without altering in any way the histological picture of the urinary deposit. In these cases as in most of the urinary and bronchitic secretions he has examined certain cellular forms were found. They are round with well defined outline, sometimes with inclusions which may be red blood corpuscles. They show sometimes a slow amoeboid movement without actual locomotion or turn on themselves displaying a different aspect in each position—hyaline rim granular protoplasm red blood corpuscles or other inclusions. They thus resemble encysted or precystic amoebae but are in fact large mononuclear phagocytes as is evident on critical examination, and above all on staining by iron haematoxylin and if need be by culture on appropriate media. These cells he has frequently found in many cases

of purulent cystitis bilharzial and non-parasitic haematuria pyelitis occurring in patients suffering also from recurrent amoebic dysentery in these cases these cells had been diagnosed in other laboratories as amoebae. In none of this material has he succeeded in finding a true amoeba. Similarly in sputa he has often failed to find the amoebae reported as present by colleagues. In one case suspected by a colleague to be suffering from the bronchial sporozoetosis of Castellani, he had found an amoeba in the sputa. Dr Khouri describes this amoeba very fully and shows that its morphology was that of *A. gingivalis*. It has no characteristic of *histolytica*.

On the matter then, of *Famibiase vésico-rénale et Famibiase bronchique* Dr Khouri's first hand and extensive observations—sharpened, as he makes clear in this paper by frequent and sometimes warm disagreement on the very point with colleagues in Alexandria, have led him to conclude that —

(1) Manifestations vésico-rénales et pulmonaires de l'amibe dysentérique " are at least extremely rare even in Alexandria where they have been so frequently described.

(2) The absence of amoebae and amoebic cysts in urine and sputa when searched for in his laboratory by " les moyens les plus accrédités," when others elsewhere had reported in the same material their presence, sometimes in abundance or when the patients had been diagnosed as suffering from amoebiasis because clinical improvement had followed on emetine therapy—shows the numerous confusions from which " les analystes et les cliniciens " suffer in diagnosing as amoebic cases which in fact are not amoebic.

(3) Even in the rare cases where a true amoeba was found, no scientific proof has been (except even more rarely) put forward to establish the species, or the pathogenic nature of the amoeba incriminated as cause of the observed affection.

At this day no one can dispute with Dr Khouri that " les moyens les plus accrédités " might be known to and employed by all " analystes et cliniciens "

H. M. H.

SCHREIFF PIERRON. De l'hépatite amibienne chronique à récidives périodiques. [Chronic Amoebic Hepatitis with Periodical Relapses.] — *Rev. Méd. Chir. des Maladies du Foie* Paris. 1929. Mar-Apr Vol 4 No. 2. pp. 170-174. With 2 text figs.

The subject is briefly yet adequately discussed. Illustrative clinical examples are cited. The author's conclusions are —

(1) The dysentery amoeba may invade the liver *primarily* without signs of enteritis and *secondarily* as a complication of amoebic enteritis.

(2) Amoebic hepatitis is a chronic complaint with long periods of remission alternating with periodic development of painless and at first simple hepatic congestion which may at times increase to an acute diffuse painful and febrile hepatitis.

(3) The acute attacks are brought on often by sudden rise of external temperature, or by alcoholic excess.

(4) The only efficacious treatment is by emetine.

(5) It is improbable that cure is ever complete; there remains the chronic infection with periodic acute relapses.

H. M. H.

YOSHITAKE (Seigo) [On 45 Cases of Liver Abscess.]—*Taiwan Igakkaï Zasshi* (Jl Med Assoc Formosa) 1929 Mar No 288 [In Japanese English summary pp 18-19] [Govt. Hosp Taihoku.]

The author states that liver abscess occurs less frequently in Formosa now than formerly. In the last 17 years 61 cases have been observed in the Government Hospital, Taihoku. 45 of these have been especially studied.

In 35 so-called tropical abscess of liver he has found amoebas only 9 times most often in connexion with amoebic dysentery average mortality 20 per cent. He has seen 9 cases of liver abscess caused by other micro-organisms with mortality 80-90 per cent. In treatment of amoebic abscess though good effect of emetine was beyond dispute yet operation was necessary for large abscesses in 16 cases laparotomy. In 28 cases transpleural laparotomy after removal of one rib. Emetine injections immediately after operation.

H. M. H.

MOREL (Ch.) & TAFIE (Jean) La forme anémique de l'hépatite amibienne suppurée. [*Anaemic Form of Amoebic Liver Abscess.*]—*Rev Méd Chirurg des Maladies du Foie* Paris, 1926 Oct.-Dec. Vol. 1 No 4 pp 418-430 [9 refs]

The authors by way of introduction translate and yet echo MANSON—where liver abscess is concerned le grand secret d'un diagnostic heureux est surtout d'y penser.

They set out in great detail their careful study of a case in which the clinical syndrome was that of a profound anaemia and wasting. The red blood cells at one period had fallen to 1 850 000 with many haemato-blasts. The liver was enlarged to three fingers breadths below costal margin. Exploratory puncture withdrew a drop of pus. Later open operation and evacuation of a litre of pus from deep in liver. emetine injections complete recovery on leaving hospital red blood corpuscles 4 000 000.

H. M. H.

PUCHULU (Félix) Curación por vómica de un absceso amebiano del hígado [*Amoebic Abscess of the Liver cured by Spontaneous Emesis.*]—*Semana Méd* 1929 July 11 Vol. 38 No 28 (1852) pp 74-75 [11 refs.]

A woman, 27 years of age, presented signs of liver abscess in the right upper lobe. Thirteen days later she vomited 150 cc of viscid, chocolate-coloured pus and 48 hours later had a similar emesis. (No entamoebae found in the pus.) Thereupon temperature dropped and general state improved. four months later blood was normal and radioscopy showed liver had returned to its normal size. Treatment consisted of anti pyrogenous vaccines before the evacuation of the abscess and emetine and neosalvarsan afterwards.

H. Harold Scott.

MANSON BAHR (Philip) & WILLOUGHBY (Hugh) On the Leucocyte Count in Liver Abscess.—*Trans Roy Soc Trop Med & Hyg* 1929 Mar 9 Vol. 22. No 5 pp 465-467 [2 refs]

In the series of twenty cases here recorded, taken in sequence as they occurred, the highest total leucocyte count was 25 000 the lowest

7 500 the average 15 000. Moreover it was in those cases with lowest total leucocyte count that the largest liver abscesses were found these last are the more chronic ones. LEONARD ROGERS (1921) has made it plain that it is only with the multiple (generally fatal) liver abscess that counts as high as 35-38 thousand are recorded. The authors figures agree with those of ROGERS in so far that relative proportion of polymorphonuclear cell count is of diagnostic and prognostic importance—increase of these cells is less marked than in bacterial infections. In one case in this series it was 35 per cent. in 12 cases 70 per cent or over and in one acute case only was it as high as 66 per cent. Lymphocytes in one case 8 per cent. in 5 cases 38 per cent. or over average 22 per cent. Large mononuclears in no case above 10 per cent average 6 per cent. Eosinophiles in eight cases were absent in the others between 1 and 6 per cent. Reduction in red blood cells and in haemoglobin occurred usually only in long standing cases with corresponding prolonged septic absorption. In only one case did anaemia approach Addisonian type. Among these 20 cases 3 deaths occurred—15 per cent. mortality

H. M. H.

COLE (Warren H.) & HEIDEMAN (Milo L.) Amoebic Ulcer of the Abdominal Wall following Appendectomy with Drainage.—*J Amer Med Assoc* 1929 Feb 16 Vol. 92 No. 7 pp. 537-540. With 5 text figs. [7 refs.] [Washington Univ School of Med. & Barnes Hosp. St Louis]

A spreading ulcer of abdominal wall followed appendectomy with drainage. Much emetine treatment had little or no effect on the ulcer which was eventually extirpated by cautery excision. No amoebae were found in the patient's stools and there was no history of dysentery.

In the ulcer pus very many "amoebae" were found. They are described as being sluggishly motile 25 microns in diameter granular protoplasm much vacuolated protoplasm in some glassy pseudopodia neck 4 to 7 microns in diameter containing chromatin bodies as well as coarse granular material. Particles of red blood cells were occasionally seen in the protoplasm. A few of the organisms were round or oval, small and without pseudopodia these probably represented the encysted form. The organisms, however found in stained sections from skin edge of sloughing portion of ulcer were of relatively small size with round or oval shape indicating probably that practically all were of the encysted form. Frequently the amoebae were engorged with lymphocytes and even polymorphonuclear leucocytes in large numbers, with only a few fragmented erythrocytes. An ordinary haematoxylin and eosin stain yielded satisfactory staining of the amoebae. Giemsa and polychrome methylene blue were slightly less satisfactory.

[The paper is illustrated by photomicrographs which do not illustrate anything to the point, and by a drawing of pseudopodia. These "amoebae" are plainly phagocytic large mononuclear tissue cells. Among the seven references is none to any of the records where true amoebic ulceration of skin has been demonstrated.]

H. M. H.

MANSON BARR (Philip H.) On a Case of Acute Amoebiasis.—*Trans. Roy Soc Trop Med & Hyg* 1929 Mar 9 Vol. 22 No. 3 pp. 447-450. With 3 figs. on 2 plates. [3 refs.]

The author states that acute amoebic dysentery in man, commencing with sudden onset and fulminating in course, is rare. In an extensive

experience in the World War he had seen only three such cases. The case here described (and well illustrated) resembled in toxic manifestations an infection by dysentery bacillus.

A ship's carpenter who had been sailing to India for many years complained of subacute abdominal pains mainly in left hypochondrium and lumbar region. Thirty-six hours later he was passing numerous brown evil-smelling stools. The pyrexia, stupor and diarrhoea suggested typhoid. Ten days later (when seen by the author) he was in collapsed condition. Abdomen extremely tender especially over caecum. Meteorism marked. Liver not tender nor enlarged. Liquid dark-brown faeces flecked with blood and mucus in which were found free forms of *E. histolytica*. Leucocytosis 16,200 rising to 24,000 before death. The serum agglutinated paratyphoid B in 1-180 dilution no reason could be found for this. Emetine injections were ineffectual the patient died two days later from intense intoxication.

Autopsy—directly after death revealed adhesions between stomach and under surface of liver pus exuded from burst abscess in left lobe of liver very friable colon of dark plum colour mucosa of caecum bluish black in places mucosa of transverse colon showed gangrene the dark Dyak-hair sloughs [pleasant variant on the more usual medical food simile nomenclature] exposing the muscle Perforation had occurred in places. Mucosa of small intestine quite normal. Liver not enlarged but contained three ragged abscesses in right and one in left lobe. In the pus motile *E. histolytica* which were successfully cultivated in Boeck Drbohlav medium. Pure *Bact. coli* cultured from inferior vena cava and right heart.

Microscopically—Colon, almost uniform coagulation necrosis of mucosa, containing vegetative amoebae. Fewer amoebae in submucosa, in partially thrombosed submucosal veins and amongst fibres of circular and longitudinal muscles. Most of the amoebae were the large tissue-invading forms with prominent nuclei some with ingested red blood corpuscles. Liver sections showed zone of intense hyperaemia surrounding one of necroses only in border line between these two could amoebae be recognized. They were found in colonies as many as 27 in one field of microscope.

The author points out that the macroscopic and microscopic necropsy findings in this case are identical with those found in kittens dying after infection with *E. histolytica*. In them also death occurs from *Bact. coli* septicaemia supervening on the necrosis of the amoeba infected gut. Emetine hydrochlor fails also to save the kitten.

H. M. H.

SANFILIPPO (Emmanuele) Ancora sulle sindromi appendicolari di origine amebica. [Symptoms of Appendicitis of Amoebic Origin.]—*Riforma Med.* 1929 Apr 20 Vol. 45 No 18 pp 525-527 [12 refs] [Inst. of Clin. Med., Univ., Catania.]

Four cases are recorded in detail, only one of which is at all convincing. This was a man of 23 years with symptoms of appendicitis. *Entamoeba histolytica* was found in the faeces. Appendicectomy was performed and when the viscous was examined microscopically "sparse cystic forms" were seen in a small vacuole in the wall.

H. Harold Scott.

CHATTERJI (K. K.) A Consideration of Surgical Complications of Chronic and Latent Amoebiasis.—*Far Eastern Assoc Trop Med Trans Seventh Congress British India* 1927 Vol. 1 pp 233-238. With 9 figs on 5 plates.

The author in an interesting paper briefly describes cases occurring in his practice where laparotomy had revealed duodenal obstruction

due to adhesion bands, causing kinking of duodenum and stomach adhesions covering gall bladder and binding it to duodenum adhesions covering surface of liver adhesions kinking caecum and attaching it to small intestine.

In all these patients (Indian and European) there was a history of colitis or dysentery in the past sigmoidoscopy revealed ulceration of rectum and vegetative or encysted *Entamoeba histolytica* were found in the stools.

[It is clear then that the patients were all infected with amoebae, but the author does not make it clear that the surgical conditions here described were the outcome of the infection with *E. histolytica*]

H. M. H.

TERREL (D) Zur Frage der Behandlung der Amöbendysenterie bei Säuglingen [Treatment of Amoebic Dysentery in Infants].—*Wien Klin Woch.* 1929 Feb. 21 Vol. 42 No. 8 pp 235-237 [14 refs.]

The author gives an interesting and full account of his treatment of 520 cases of amoebic dysentery in infants and young children in Palestine. The diagnosis was made as result of microscopical examination of stools, and he was able to follow up results of treatment for two to three months after its cessation. Analysis of his results leads him to conclude that—

(1) Emetine is the best drug for amoebic dysentery in children. He has observed no toxic effects.

(2) Rivanol or yatroen solutions, as enemata, are valuable adjuvants.

(3) As a winding up of treatment, and to destroy cysts, spirocid and stovarsol are effective. They must be given in small doses (0.005-0.03 gm) and never at the same time as emetine.

(4) The best treatment proved to be a combined one—emetine in the beginning with at the same time enemata of rivanol or yatroen solution and at the end small doses of spirocid or stovarsol alone.

H. M. H.

BEIHEFTE ZUM ARCHIV FÜR SCHIFFS UND TROPEN HYGIENE. 1928. Vol. 32 No. 4 pp 5-40 [159-194].—Rivanol bei Amöbendysenterie. [Rivanol in Amoebic Dysentery] i. WAGNER (O). Untersuchungen ueber die experimentelle Chemotherapie der Amöbenruhr pp 5-15 [159-169] [22 refs.] [“I G Farbenindustrie-Aktien Gesellschaft Höchst a. M.”] ii. SCHUMANN (O). Ueber die spasmolytische Wirksamkeit des Rivanols pp. 16-21 [170-175] With 3 charts in text. [12 refs.] [“I G Farb. Akt. Gesell. Höchst a. M.”] iii. PETER (F. M.) Die interne Rivanolbehandlung der Amöben Dysenterie pp. 22-40 [176-194] With 4 charts in text. [7 refs.] [Works Hosp. Surinam Bauxite Co Moengo Dutch West Indies.]

This number is devoted to studies on the action of rivanol (2,4-dihydroxy-6- θ diaminoacridinylactate) on the amoebae of dysentery and on the animal (cat and man) suffering from amoebic dysentery.

i. Dr Wagner records his experiments and observations, on *in vitro* cultures of *Entamoeba histolytica* and on infected kittens. Control observations were made on infected kittens treated with trypanavin, arsen-akridin and yatroen and with these drugs and with emetine, on *E.*

histolytica in *vitro* cultures. His results in the *in vitro* culture tests favoured rivanol as an amoebicide. A 1-1 000 solution of rivanol killed all amoebae in 20-24 hours. This result was given by trypaflavin and arsen-akridin, only in dilutions of 1-250 by yatren in 1-50 and by emetine in 1-100. All the experimentally infected kittens died eventually but the advantage [slight, as revealed by the tabulated experimental data] lay with the rivanol solutions in that there was a quicker disappearance of amoebae from stools and a longer post infection life in the rivanol treated kittens. The most effective rivanol dilutions were apparently 1 1250 to 1 500.

ii. Dr Schaumann records his experiments on the gut of the rat and rabbit, the results of which demonstrate that rivanol has an antispasmodic action on the unstriated muscle of the gut, approximately equivalent to that of papaverin.

iii. Dr Peter states that following UCH's report (1926) on the beneficial result of rivanol clysmas in amoebic dysentery he too recorded (1927) its curative action in a series of such case microscopically confirmed and controlled. Besides its apparently direct action on the parasite he then noted its rapid effect in causing cessation of pain and tenesmus, and the stools became faeculent and formed. The drug had a definite anaesthetic action. He now records in detail and at length his further observations on a series of 34 patients under his care in Moengo Dutch Guiana. *E. histolytica* was demonstrated in each of these cases. Some were severe primary cases others more or less chronic, and some had already been treated with emetine or emetine-yatren without success. They were given rivanol by mouth in single doses of 30 to 50 mgm (small children about 1/10 of this dose) three times, or oftener a day for periods varying with the patient up to 9 days. A few of the patients had rectal clysmas of rivanol, 1-3 000 to 1-5 000 as well. In all cases *E. histolytica* disappeared from stools in 3 to 4 days in a few in 6 to 7 days. The tabulated data show that parasites were not detected in one case 14 days, in one case 1 month, in two cases 2 months after cessation of treatment. Four patients were treated successfully with rivanol as ambulant cases. In all cases the exhibition of rivanol *per os* was quickly followed by cessation of pain and tenesmus by disappearance of blood and mucus from stools, by cessation of frequency of defaecation, and by stools becoming faeculent and formed. No toxic effects were noted. The author claims that results in this series establish that rivanol destroys both vegetative and resistant encysted forms of the parasite, and that its effect on the gut is antispasmodic and anaesthetic.

[While these careful clinical observations have an importance that needs no stressing the absence of concurrent controls renders them of small value.]

H. M. H.

GESSNER (Otto) Ueber die Darmwirkung von Rivanol, Yatren und Emetin (Zugleich Bemerkung zu der Arbeit von Schaumann Ueber die spasmolytische Wirksamkeit des Rivanols s. diese Zeitschrift Beihefte 1928 Bd. 32, Nr. 4 S. 16-21) [Intestinal Action of Rivanol, Yatren and Emetine.]—*Arch. f. Schiffs u. Trop.-Hyg.* 1929 May Vol. 33 No. 5 pp. 277-281 [9 refs.] [Pharmacol. Inst. Univ. Marburg.]

An account of laboratory experimental observations on the action of these drugs.

Rivanol. The author criticizes SCHAUMANN's work on the ground of faulty experimental technique and rejects his findings.

Emetine. On the still-living gut of guinea-pig and rat acts by lowering tone and inhibiting rhythmical movements as in the pilocarpin treated gut.

Yatren acts as a stimulant to the gut, exciting peristalsis in dilution 1:100 sometimes however in still greater concentration it tends to produce paræsis of gut. It is much less toxic than rivanol and its use in the acute stage of amoebic dysentery ensures a beneficial clearing out of the gut contents.

H. M. H.

DE MELLO (Froilano) & DA CRUZ (L. J. C.) Résultats du traitement expérimental de divers états d'amebíase intestinale par le Yatren *parissimum*. [Results of Treatment of Intestinal Amoebiasis by Yatren.]—*Arquivos da Escola Med. Cirurg. de Nova Goa*. 1929 Ser. A. No. 4 pp. 539-564 [39 refs.]

A full and detailed account of clinical and parasitological observations. Six acute, 4 subacute, and 5 chronic cases were treated.

The authors' conclusions are emphatically in favour of Yatren *parissimum* as the drug of choice in treatment of amoebic dysentery.

H. M. H.

FISCHER (Otto) Ein mit Yatren gebelter Fall von Amöbenhepatitis. [Amoebic Hepatitis treated by Yatren.]—*Arch. f. Schiff- u. Trop. Hyg.* 1928. June Vol. 32. No. 6 pp. 326-327 [8 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author notes that hitherto emetine has held its own as the therapy of choice for amoebic hepatitis with or without abscess formation. The case here recorded had suffered for 2 months from diarrhoea with bloody stools and fever. He was found to be wasted, with acute pain and tenderness over liver region. The liver was enlarged and the abdominal wall inflamed. The mucous sanguineous stools contained many typical dysentery amoebae. There was anaemia and a leucocyte count of 17,000. There was intermittent fever. Treatment was by yatren chylers—and later by pills *per os*. Symptoms and physical signs rapidly vanished. Amoebae, blood and mucus disappeared from stools. The patient gained in weight, and the leucocyte count sank to 8,000. On the third day the temperature was normal.

H. M. H.

FORBES BROWN. Yatren in Dysentery.—*Jl. Port of Spain Med. Soc.* 1927 pp. 174-175.

Recommends E.B.L. orally with Yatren 105 rectally as the most effective treatment for chronic relapsing amoebic dysentery and cites in support of his own experience to this effect, the practice of the London and Liverpool Schools of Tropical Medicine.

H. M. H.

NASSET (Elizabeth Custer) & KOFOED (Charles A.) The Effects of Radium and of Radium in Combination with Metallic Semifibers on *Endamoeba dysenteriae* in Vitro.—*Univ. California Public Zool.* 1928. Nov. 8 Vol. 31 No. 17 pp. 387-416. With 7 text figs. & 14 figs. on 2 plates. [38 refs.]

The experiments are fully described and discussed.

The authors' summary and conclusions are—

"1 The division rate of *Endamoeba dysenteriae* *in vitro* is stimulated from two to four times over that of the controls by exposure to radium radiations.

2. The stimulation continues for not more than 24 hours after the removal of the radium and is followed by a decided retardation of the division rate.

3. Screening out the beta rays with aluminum does not remove the stimulative effect although stimulation may not be so marked as when unshielded radiations are employed.

4. The after effect of radiation on retardation in division rate is not so prominent when the beta rays are removed.

5. Radiated cultures bear transplanting indefinitely. If death did occur it might be ascribed either to the direct effect of the radiations on the amoebae or to the modifications induced by the radiations on certain bacteria related to the growth of the amoebae.

6. Radium produces morphological changes in amoebae in cultures, the most conspicuous being in the structure of the nucleus. Irradiated amoebae may increase in size, enucleation or autotomy may occur and the nuclear chromatin may become homogeneous or disintegrated.

7. A large amount of radium acting for a short time produces more striking morphological changes than a smaller amount acting for a longer time.

8. Gamma radiations are capable of producing characteristic changes in morphology.

9. The effects of radiation persist for four to six days after the removal of the radium and then the culture gradually returns to normal.

10. The remarkable resistance of *Endamoeba dysenteriae* to radium *in vitro* does not suggest the use of this agent in treating cases of human amoebiasis. The response of *E. dysenteriae* *in vivo* to radium may prove to be of a different order from that *in vitro*.

11. *Endamoeba dysenteriae* *in vitro* is killed when exposed to radium in combination with sub-lethal dilutions of mercuric or lead chloride (1-50 000). This effect may be due to the absorption of the metal by the amoebae and the production of secondary radiations, or to radiationless transfer.

H. M. H.

MANSON BAHR (P. H.) & KILNER (T. Pomfret). Irrigation of Amoebic Abscess Cavities by the Carrel Dakin Method.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929, Jan. 30, Vol. 22, No. 4, pp. 339-341. [3 refs.]

If aspiration of liver abscess pus and subsequent treatment by emetine injections is the ideal procedure, yet in some cases (MANSON BAHR and MORRIS 1926) it does not arrest suppuration and extirpate amoebae from liver. Free opening and drainage may have to be resorted to, but even this may fail without continuous irrigation of abscess cavity to ensure complete evacuation of amoeba-laden debris and promote granulation. Carrel-Dakin method fulfils these conditions.

Case I—recurrent dysentery for five years. He had had emetine hypodermically—72 grs. in first course, 24 grs. in second, and in third course emetine-bismuth-iodide tablets for 24 days. As judged by ordinary standards he was thoroughly dosed with emetine which had not prevented formation of a large hepatic abscess. No free or encysted *E. histolytica* were found in faeces. Aspiration of liver abscess gave on first occasion 10 oz. of pus, on second 8 oz. on third 6 oz. After four weeks there being no improvement open operation was performed—large quantity of thick liver pus escaped. Carrel's tube inserted and irrigation with Dakin's solution two-hourly for nineteen days. To extirpate amoebic infection prolonged after course of E.B.I. and yatraen lavage (MANSON BAHR and SAYERS, 1927). The patient had remained permanently cured.

Case II—relapses of dysentery since contracting it in 1916 in India. Frequent intensive courses of emetine injections, and pills. Pains right shoulder and right chest transpleural open operation with resection of rib, much pus evacuated, subsequent treatment with emetine injections and E.B.I. Nevertheless, when first seen by the authors, reaccumulation of pus, numerous active *E. histolytica* in faeces, grave anaemia, fever open operation, evacuation of 3 pints of pus under pressure Carrel-Dakin irrigation, and E.B.I. and yatren lavage as in Case I. Amoebic infection of intestinal canal was extirpated no further dysenteric symptoms had occurred patient had remained well. Rapid recovery from the grave anaemia was aided by daily doses of liver extract. The authors note that in both cases the physical improvement after institution of Carrel-Dakin irrigation was very evident.

H. M. Hanschell.

BRULÉ, LAPORTE & RAGU Deux cas d'abcès pulmonaires, non amibiens, rapidement améliorés par le traitement émetinien. [Two Cases of Non-Amoebic Pulmonary Abscess cured by Emetine.]—*Bull. et Mém. Soc. Méd. Hôp. de Paris*. 1929 June 10 Year 45. 3rd Ser. No 18 pp 699-708. [8 refs.]

The authors give full clinical descriptions of these two cases. The pulmonary abscess was a sequela of influenza. In neither case did history or laboratory examinations reveal amoebiasis. They find the action of emetine hydrochlor hypodermic injections in these two cases of pulmonary abscess difficult to interpret, but of its decisive beneficial therapeutic effect these cases leave no doubt.

[Again the still needed record that clinical cure after emetine therapy does not support a diagnosis of amoebiasis.]

H. M. H.

LANDERON (L.) & POUMEAU DELILLE (G) Un cas d'abcès du poulmon guéri par l'émetine [Abscess of Lung cured by Emetine.]—*Bull. et Mém. Soc. Méd. Hôp. de Paris*. 1929 Feb. 25 Year 45. 3rd Ser. No 6 pp 285-298.

The condition was acute in onset radiocopy revealed abscess in the upper lobe of the right lung. The sputum was mucopurulent, not blood stained. Fever rapidly disappeared and the lesion in lung quickly resolved, after treatment by emetine intravenous injections. There was no history of previous dysentery. Over 21 years previously the patient had spent two years in various parts of Algeria.

The authors refuse [refreshingly] to pronounce this case amoebic because of its rapid cure by emetine. They point out that emetine has a beneficial effect on suppurative conditions apart from those caused by amoebae.

H. M. H.

SCUDERI (Giovanni) & BARONI (Benigno) Esiste una amebiasi pleurica. A proposito di un caso di raccolta parietale della pleura sinistra con presenza di forme vegetative di *Entamoeba histolytica*. Parte prima—Discussione clinica [SCUDERI]. Parte seconda—Ricerche anatomo-patologiche [BARONI]. [A Left-sided Pleuritic Effusion containing Vegetative Forms of *Entamoeba histolytica*.]—*Giorn. di Batteriol. e Immunol. Turin* 1928. Aug. Vol. 3 No 8. pp 540-553 With 5 figs. [8 refs.]

A man of 24 years had suffered five years previously with an attack of muco-sanguineous diarrhoea lasting two days. Four years later left-sided pneumonia terminating by crisis on the seventh day. Two months later

attacks of slight haemoptysis, followed by shivering and signs of pleurisy. Aspiration withdrew an odourless, chocolate-coloured fluid like liver pus containing motile amoebae operation.

The author states that there are three possibilities explaining the condition (1) Primary localization of the *E. histolytica* in the pleura (2) Conveyance by lymphatics from the lung or some subdiaphragmatic focus (3) Rupture into the pleura from a collection of pus in the lung or abdomen. There was no evidence of hepatic involvement and a fragment of the parietal pleura examined histologically revealed many entamoebae throughout its thickness and in the underlying tissue. They were also found in the faeces after a purgative. Hence it is inferred that they were conveyed metastatically to the pleura.

H. Harold Scott.

KHOURI (J) Sur un cas d'hématurie avec présence d'amibes (?) dans les urines [Case of Haematuria with (?) Amoebae in the Urine.]—*Bull Soc Path Exot* 1929 Mar 13 Vol. 22. No 3 pp 158-162.

The patient, a native of Egypt, when 28 years old suffered from dysentery followed by liver abscess. When 15 years old he had acquired syphilis and later gonorrhoea. Eight years after the operation for liver abscess he developed intermittent haematuria which lasted for 21 years—until death.

In 1924—four years before death—the author examined the urine and found in it neither amoebae, nor Koch's bacillus, nor parasites other than a few streptococci—and again with like result during a haematuria relapse in 1925.

In 1926 during haematuria attack, the urine as on the previous occasions was passed in the author's laboratory and examined directly and after immediate centrifuging. No amoebae were found but the urine revealed large rounded cells containing a protoplasmic mass, without inclusions, turning slowly on themselves without appreciable locomotion, showing also a thin hyaline rim. Staining with iron haematoxylin revealed neither free nor encysted amoebae. The cells were large mononuclears such as he had found on other occasions in urine stools and sputa and which had been taken by others to be amoebic cysts.

In September 1927 during the author's absence the patient had haematuria. The urine was examined by a colleague who reported finding in it amoebae of *histolytica* type. Amoebic cystitis was diagnosed and emetine therapy instituted—with no effect on the haematuria.

In November 1927 the author again examined the bloody urine and in one slide preparation of fresh urine found a form resembling an amoeba. Other preparations of same material stained with iron haematoxylin revealed no amoebae but only large mononuclear phagocytes. During the 8 months following and up to the patient's death (no autopsy) the author examined the urine on very many occasions on none was an amoeba found. Repeated stool examinations also failed to show amoebae. The clinicians however remained unshaken in their diagnosis of une amibose vésico-rénale. The author describes the amoeba found on the one occasion and gives reasons for diagnosing it as *Trichomonas*, an opinion in which BRUMPT and DESCHAMPS concurred—the latter pointing out once more the necessity of parasitological proof of amoebae, i.e. wet fixation and differential staining with iron haematoxylin, and inoculation into kitten.

Dr Khouri ends his paper by stating that in too many of the cases reported in Egypt as amoebic, l'amibe vraie has been the one thing always lacking [as has been more than suspected by any informed reader of the said reports]

H. M. H.

VAN CUTSEM (A.) Un cas d'amibiase urinaire [Case of Urinary Amoebiasis].—*Bull. Nid du Katanga*. 1928. Vol. 5 No. 1 & 2 pp. 16-19

A child, 4½ years old, suffered from haematuria. Microscopic examination of stools was negative that of urine revealed besides red blood corpuscles, epithelial cells, crystals, granular and epithelial casts, a multitude of granular bodies about 30 microns in appearance exactly like "Amoeba Loeschia Histolytica" in the precystic stage a very few of these contained blood corpuscles. All were non-motile, in spite of warming the specimen. Improvement and finally apparent cure followed on emetine injections. The author cites PETZTAKIS's like observations in Egypt in support of his diagnosis of this case as one of amoebic nephritis. (It is no support. The only permissible support is the demonstration in properly stained specimens of the characters of *E. histolytica*.)

H. M. H.

TOULLEC (F.) & BLANCHARD (M.) Guérison de la dysenterie amibienne chronique par la méthode de Montel. [Cure of Chronic Amoebic Dysentery by Montel's Method].—*Bull. Soc. Path. Exot* 1929 Mar 13. Vol. 22 No 3 pp 156-158.

The patient (a Legionary) had contracted dysentery 6 years previously in Syria. His history sheet recorded frequent relapses, frequent emetine courses and that on occasion vegetative and encysted amoebae had been found in his stools. For 6 years he had, in between acute attacks of dysentery passed three or four semi fluid stools a day. When seen by the authors the patient had an acute dysentery attack, and the stools revealed numerous cysts of *E. histolytica*. Emetine and stovarsol were followed by clinical improvement, but three to four semi fluid stools a day were still passed. The authors then tried the anti-dysenteric serum prepared by MONTÉL (Saigon) On two consecutive days 50 cc. by mouth, and 30 cc. per rectum. From then onwards the patient passed only one formed stool a day in which repeated examinations revealed no cysts. He gained 6 kgm in weight. The authors reject "bacillary" for the nature of the dysentery and insist on "amoebic" [But on no grounds disclosed in the paper that will stand criticism]

H. M. H.

MONTES PEREIRA (Justo) Enteritis amibiana y muerte súbita, probablemente por fibrilación ventricular. Intoxicación emetina. [Amoebiasis and Sudden Death. Emetine Poisoning].—*Semanal Med.* 1929. June 27 Vol. 86 No. 26 (1850) pp. 1697-1700. [19 refs.]

The patient, a woman 26 years of age, complained of acute pain in the right hypochondrium and shoulder. She had had a previous attack of diarrhoea with mucus and blood in the stools. Cysts of *E. histolytica* were numerous in the faeces and emetine was given. A week later pus was removed from the liver by aspiration. Three weeks afterwards irregularity of the pulse was noticed and a day or two later she suddenly became rigid, with dilated pupils, was pallid, then cyanosed and bathed in perspiration, and died. The author discusses the question of causation. He mentions the various forms of arrhythmia which have been associated with acute amoebic dysentery—sinus arrhythmia, ventricular extrasystoles, tachycardia and bradycardia, but in this patient he ascribes the condition to emetine intoxication and the cumulative action of the drug. During the first two weeks 0.87 ggm. was given, two doses daily but never exceeding 0.08 ggm. This was well tolerated, producing no nausea, debility or

any cardiac disturbance. After an interval of six days a daily dose of 0.04 grm. was given, but on the fifth day arrhythmia appeared and the drug was stopped the total quantity amounted to 1.07 gm. in 26 days.

H Harold Scott.

STERN (E) Anaphylaktischer Chok und Tod nach 0.02g intraglutealer Emetineinspritzung bei einem Kinde. [*Anaphylactic Shock and Death of a Child after Emetine Injection.*—*Arch f Schiffs- u Trop-Hyg* 1928 Dec. Vol. 32. No 12 pp 610-612.]

The case occurred in Tiberias, Palestine. The author was called to a previously healthy child 2 years old who on the third day from onset of amoebic dysentery had received, for the first time an injection into the gluteal region of 0.02 gm. emetine. This was immediately followed by severe vomiting; rapid onset of collapse patient pulseless icy cold Cheyne-Stokes breathing cessation of heart beats Camphor adrenalin, caffeine, lobelin, were without slightest effect. The patient died. The author goes on to stress in contrast, the safety and efficacy of yatren citing in support his own clinical experience with that drug.

[In this paper no evidence whatever is so much as suggested why the fatal shock should be labelled anaphylactic nor even moderately satisfactory evidence that the dysentery was in fact amoebic. That emetine (demonstrated toxic to heart muscle cells!) might be more than usually dangerous in bacillary dysentery (toxic!) is an expectation not new and yet well founded.]

H M H

SANDERS (Elizabeth P) Changes in the Blood Cells of Kittens resulting from Infections with *Endamoeba histolytica*.—*Amer J Hyg* 1928. Nov Vol. 8. No 6 pp 963-989 With 5 graphs. [43 refs.] [School of Hyg & Public Health, Johns Hopkins Univ Baltimore Md.]

In a survey of the literature concerning the effect of *E. histolytica* on the blood cells of infected hosts it was found that a polymorphonuclear leucocytosis was often associated with amoebiasis in man, and that a large mononuclear increase had been reported the leucocytosis was usually more severe in cases of amoebic abscess of liver. There were no records of blood counts in kittens though these were used for experimental work with *E. histolytica*. Bacteraemias or septicaemias often found in kittens dying of amoebiasis were suggested as cause of death, and believed to be present in man more often than reported. With these results in mind, the author undertook two groups of experiments.

(1) Ten kittens with amoebiasis and five uninfected as controls. Eight of the ten showed clearly polymorphonuclear leucocytosis coupled with a rise in the large mononuclear cells. Two were resistant to inoculation with *E. histolytica* and when they finally developed it, had atypical histories. The prepatent period of *E. histolytica* in amoebic kittens was 3-7 days infection 5 days to 8 weeks (one recovered after an infection of two months). Necropsy of all the amoebic animals revealed ulcerated haemorrhagic colons three had liver abscesses.

(2) Ten amoebic and ten uninfected control kittens. The amoebic developed polymorphonuclear leucocytosis with large mononuclear increase. Blood cultures from heart of ten normal kittens were negative and cultures from four kittens before inoculation were negative. Nine cultures made from five kittens during infection were negative. Cultures from six

amoebic kittens just before death showed bacteraemia. Leucocytes were always present, bacteraemias were terminal the former were therefore independent of blood stream infections or of liver abscess formation.

The author's experiments also revealed that a strain of *E. histolytica* may lose virulence in culture. A normal blood count for kittens 6 weeks to 2 months old was determined, viz. —

Red blood cells	5 to 6½ million.
White blood cells	8-12,000.
Polymorphonuclears	45-71 per cent.
Lymphocytes	22-48 per cent.
Large mononuclears	2-5 per cent.
Eosinophiles	1-5 per cent.

It was also found that normally acquired intestinal parasites, e.g. coccidia, trichomonads and worms caused minor changes in the numbers of the different kinds of white blood cells.

H. M. H.

REGENDANZ (P) Ueber die Uebertragung der *Entamoeba histolytica*, *Entamoeba coli* und *Dientamoeba fragilis* auf Ratten. [Transmission of *E. histolytica*, *E. coli* and *D. fragilis* to Rats.]—*Cent. f. Bakt. I Abt. Orig.* 1929 Apr 25 Vol. 111 No. 68 pp 412-419 (18 refs.) [Inst for Ship & Trop Diseases, Hamburg]

The author reviews observations of various workers on amoebae of rats and mice by LYNCH (1925) BRUG KESSEL, CHIANG. He describes his investigation of natural amoebic infections (very rare) in his laboratory bred rats and his precautions (careful repeated examinations of faeces after dosing rats with salts) to exclude infection of rats before experiment. Full accounts are given of his numerous experiments and of his daily observations on the rats after the experiment generally infection was not easily imposed.

1. He succeeded in infecting rats with *E. histolytica* (1) by rectal injection of cultures of the parasite (2) by rectal injection of human faeces containing tissue (*histolytica*) forms, and minuta forms, of *E. histolytica* (3) by rectal injection of faeces of cat containing tissue forms of *E. histolytica*. He failed to infect rats by feeding through catheter passed-into-stomach with human faeces containing tissue forms and cysts of *E. histolytica*.

No rat infected with *E. histolytica* showed outward signs of dysentery. One autopsy revealed some signs of dysentery in caecum, macroscopically and in sections but no amoebae could be seen in mucosa or submucosa. The slightness of the *E. histolytica* infection, and its apparent nonpathogenicity in his rats makes the author doubt if LYNCH and CHIANG are right in holding the rat to be a natural carrier and spreader of *E. histolytica* infection to man. His own attempts to set up dysentery in *E. histolytica* infected rats by damaging the colon mucosa by injecting water at 60° C. or by giving toxic doses of mercury produced only temporary passage of mucus per rectum.

In the rats gut the minuta forms showed ingested bacteria, as with *E. histolytica* in culture. Also as in culture, so in the rats gut there was rapid change in the tissue forms. Though he has indisputably infected the rat with the tissue forms yet minuta forms subsequently appeared.

n. He was successful in infecting rats with *E. coli*—by rectal injection—of human faeces and of rats faeces containing active forms and cysts of *E. coli*. He failed to infect rats by feeding them through catheter passed into-stomach with human faeces containing active forms and cysts of *E. coli*.

iii. *Dictyamoeba fragilis*—hitherto found only in man he has infected the rat by rectal injection of human faeces containing this amoeba.

H. M. H.

TRIPOLI (Carlo J.) **Preparation of Culture Media for Routine Cultures of Feces for Pathogenic Amoebae.**—*Proc Soc Experim Biol & Med* 1928 Dec. Vol 28, No 3 pp 245-247 [6 refs]
[Lab of Clin Med. Tulane Univ Louisiana.]

The author claims that as an aid to microscopic examination of faeces for the diagnosis of pathogenic amoebae, routine cultures should occupy a prominent place in the clinical laboratory. Dobell's modifications (1926) of Boeck and Drbohlav's original media (1925) is best suited for routine use. It furnishes a definite source of assimilable carbohydrate as food for the amoebae and further provides a mild antiseptic (acriflavine) to inhibit growth of the bacteria which would prevent a culture of the amoebae.

In obtaining and maintaining a large number of cultures of *E. histolytica* the author has studied many details of producing a uniformly successful medium. He here gives in full detail results of these studies they cannot be summarized—for their value lies in their full detail and in attention to that detail.

It was found that initial growth occurred usually in both plain and acriflavine charged media but sometimes only one variety of medium gave a positive culture. In a large series all proven cases gave cultures of the pathogenic amoeba. Non-pathogenic strains occasionally grew but did not withstand successive transplanting in the two media described. Fresh cultures should be carefully nursed and transplanted every 36-48 hours. Older cultures may be transplanted every 3 to 6 days.

H. M. H.

YOSHITAKE (Seigo) **Preliminary Report on the Cultivation of *Entamoeba histolytica***—*Taiwan Igakkai Zasshi (Jl Med Assoc Formosa)* 1929 Jan. No 296 [In Japanese English summary p 4]
[Govt. Hosp Taihoku.]

The author records successful cultivation of amoebae from mucous guineous stools of dysentery patients on H. Vogel's modification of Boeck & Drbohlav's medium. The amoebae multiplied and were living for 15 to 117 days. To keep them vigorous it was necessary to alternate blood agar medium with the starch-agar medium. The amoebae grown on artificial media diminish a little in size as compared with the nutritive form found in human faeces. To obtain pure cultures the same medium was inoculated with pus from two cases of amoebic liver abscess where *E. histolytica* had been found alone to exclusion of other micro-organisms. The amoebae lived in the one case for 27 hours and the other for 48 hours, but showed no multiplication. The cultivated amoebae inoculated into rectum of 5 kittens failed to infect the animals presumably because the inoculum was too old, having passed through many generations on artificial media.

H. M. H.

SAUTET (Jacques) Pouvoir pathogène des cultures d'*Entamoeba histolytica* faites en présence d'amidon de riz. [Pathogenic Power of Cultures of *E. histolytica* made with Rice Starch.]—*Ann. Parasit. Humaine et Comparée* 1929 Mar 1 Vol. 7 No. 2 pp. 140-144. [2 refs.]

Many workers have shown that pathogenicity of *Entamoeba histolytica* is apparently always maintained in cultures made according to the method of Boeck & Drbohlav. This is not the case however when the culture medium is modified by addition of rice starch. For example DOBELL & LAIDLAW (1926) [this *Bulletin* Vol. 24 p. 363], concerning this rice starch medium wrote—"Although we inoculated 7 kittens intrarectally with cultures containing enormous numbers of active and apparently normal amoebae we did not succeed in infecting a single kitten. The author on the contrary found (1926) that in rice starch medium the amoebae after the 26th, 78th and 100th subculture killed kittens with production of typical lesions of amoebic dysentery which contained haematophagous amoebae. He notes that the kittens were inoculated not only with amoebae but also with a large number of bacteria which possibly play an important pathogenic role.

He here records observations on three strains of *E. histolytica* from three dysenteric patients. Rice starch cultures of two of these strains (one of which was apparently of low virulence for man) proved fatal to kittens. Rice starch culture of the third strain (virulent in man) failed even to infect kittens, although direct inoculation of amoebic stools from the respective human patient into the kitten produced a fatal dysentery in the latter.

H. M. H.

COUTILLEN (F.) Recherche du fer chez l'amibe dysentérique hématophage. [Test of the Haematophagous Dysenteric Amoeba for Iron.]—*Bull. Soc. Path. Exot.* 1928 May 9 Vol. 21 No. 5 pp. 369-371. [1 ref.] [Parasit. Lab. Faculty of Med., Paris.]

Employing a potassium ferrocyanide and dilute HCl technique, the author could demonstrate the presence of iron in epithelium of gut and in phagocytic endothelial cells containing red blood corpuscles in various stages of digestion—but in numerous amoebae from human amoebic dysentery cases and from the kitten experimentally infected with amoebic dysentery which contained red blood cells in various stages of digestion, the same technique failed to demonstrate any trace of iron. The author gives as possible explanations—

(1) Haemoglobin in the red blood cells is broken up extremely slowly, and the iron is liberated in too small quantities to be shown up by the microchemical technique employed, excretion in the dysentery amoeba being much more rapid than the slow digestion of the phagocytised red blood cells, or

(2) The amoeba utilises only the stroma of the red blood cell, excreting the haemoglobin as such unaltered.

H. M. H.

BACILLARY DYSENTERY

SARTORIUS (Fr.) Zur Ruhrdiagnostik. [Dysentery Diagnosis.]—*Cent. f. Bakt. I Abt. Orig.* 1929 Mar 8. Vol. 111 No. 4/5. pp. 266-288. [16 refs.] [Hyg. Inst., Univ., Münster i.W.]

Discussion still continues regarding the proper classification of strains of dysentery bacilli. A number of strains, other than the early

separated Shiga Kruse dysentery bacilli were subjected to test by the author with the following results —

1. Only the so-called E strain of Kruse has yet been satisfactorily separated from other groups. Its characters are fermentation of mannite maltose and saccharose absence of gas formation in glucose agar no formation of indol and coagulation of milk in about 10 days. To these must be added a high degree of resistance to dye stuffs especially trypanflavin capability of utilizing ammonium lactate and succinate as sources of nitrogen and practical absence of coagglutination by sera of other dysentery types.

2. The exceptional position of the J strain (Schmitz bacillus) giving no coagglutination with sera of other dysentery strains and giving a positive indol reaction requires further investigation in regard especially to its mannite, maltose and glucose fermentation.

3. The definitive characters of the remaining dysentery strains are, mannite fermentation without gas and absence of formation of gas in glucose. They are mostly indol positive. Behaviour in litmus milk, presence or absence of catalase properties and special resistance to dye stuffs are of little value for separation of strains into groups. None of the mannite fermenting dysentery organisms can utilize ammon. benzoate and ammon. citrate as sources of nitrogen a number can utilize ammon. lactate while few except the E strains can utilize ammon. succinate. Agglutination and absorption tests serve to differentiate sharply five groups in the case of 90 per cent. of the test strains—group I (Kruse A) 36.6 per cent. II (probably Kruse B and C) 17.3 III (Kruse H) 17.3 IV (probably Kruse D) 11.5 and V 5.8 per cent.

W F Harvey

MURAKAMI (K.) Darstellung spezifischer Seren gegen Dysenteriebazillen und ihre agglutinatorische Einteilung [*Procurement of Specific Dysentery Sera and their Use in Classification.*—*Ztschr f Immunitätsf u Experim Therap* 1929 Vol. 61 No 5/6. pp 486-498 [Bact Inst Univ Sendai.]

By a specific serum is meant here one which will only agglutinate organisms of one serological group and no others. Tests were first applied with sera corresponding to strains of 10 groups originally isolated by AOKI and 6 were by agglutination and absorption tests found to be specific sera. Agglutination tests were carried out with these 6 sera upon 260 strains of dysentery bacilli. Groups of organisms were found the members of which agglutinated strictly with only one of the 6 test sera. Two groups were found of organisms agglutinating with two of the sera only and one agglutinating with none of the sera. Fresh sera were then prepared from a certain number of the non agglutinating organisms and these were used to differentiate this group. Organisms selected from the new groups obtained, together with organisms selected from the originally specifically agglutinating organisms were tested against their corresponding antisera with the result that now 10 specific sera were obtained. These served for retest of the 260 strains. By a repetition of the process already described fresh sera were obtained in the case of strains which did not specifically agglutinate and the whole of the series of organisms was finally differentiated into 11 groups. Corresponding sera were obtained

which were strictly specific in the sense that they reacted only by cross agglutination and absorption tests with their homologous organisms and showed no co-agglutination at all. Certain strains were found to react quite specifically with a single serum but not quite to titre.

W F Harvey

Cruz (J da Costa). Action de la chaleur sur les agglutinines du sérum anti-bacille de Flexner [Action of Heat on the Agglutinins of Flexner Serum].—*C R. Soc Biol* 1929 Apr 8. Vol. 100 No. 11 pp. 848-851 [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

If a powerful agglutinating serum is set up in serial dilution with a sufficiently thin suspension of the homologous organism, agglutination appears first in one of the tubes of the series and later more or less symmetrically in the tubes on either side of the first. The term optimum is applied to the first appearing agglutination. The experiments here carried out with a Flexner serum unheated and heated for 5 10 15 and 20 minutes at 55° C showed the following optima respectively 1 in 320 after 30 min. at 37° C. and 15 min. at room temperature (28° C) 1 in 640 to 1 280 after 30 min. at 37° C. and 20 min. at room temperature 1 in 1,280 after 30 min. at 37° C. and 45 min. at room temperature 1 in 1 280 after 30 min. at 37° C. and 1 hr 15 min. at room temperature between 1 in 2,560 and 5 120 after 30 min. at 37° C and 1 hr and 45 min at room temperature. The appearance of agglutination in the first tube (optimum) is delayed by the heating at 55° C but is raised in titre. The end titre in all the cases was 1 in 20 000. This and further experiments lead to the conclusion that the heated agglutinins have less affinity for antigen than those of fresh serum, or expressed otherwise that the antigen is capable of absorbing a greater amount of fresh serum antibody than of heated serum antibody. The explanation of the displacement of the optima of agglutination with heating of the serum is probably to be found in this fact. Absence of agglutination, similarly in the so-called agglutinoid zone may be attributable rather to excess of free antibodies in the mixtures than to those combined with the antigen.

W F Harvey

Cruz (J da Costa). Action de la chaleur sur l'agglutinogène du bacille de Flexner et optimum d'agglutination. (Action of Heat on the Agglutinogen of Flexner's Bacillus and on Optimum Agglutination.)—*C R. Soc Biol* 1929 Apr 8. Vol. 100. No. 11 pp. 868-869 [Oswaldo Cruz Inst., Rio de Janeiro.]

The test suspensions were subjected to temperatures of 100 120, 134 and 200° C. for 30 minutes and were then set up in mixtures with different dilutions of anti-Flexner serum. With an unheated suspension of bacteria the optimum agglutination was found with dilutions of serum between 1 in 640 and 1 in 1,280 and the agglutination titre after 24 hours at 1 in 40 000. For suspensions heated at 100, 120 and 130° C. the optimum agglutinations were 1 in 160 between 1 in 64 and 1 in 128 and 1 in 80 respectively while the 24-hour titres were

all 1 in 10 000 Suspensions heated at 200° C. gave a brown liquid and an agglutinated bacterial deposit which was microscopically amorphous. The supernatant liquid of this suspension was quite unable to fix any agglutinin.

W F Harvey

WICHMANN (F W) Ueber die Bildung des Dysenteriegiftes in synthetischen Nährböden. [Production of Dysentery Toxin in Synthetic Media.]—*Arch a d Staatsinst f Exp Ther u d Georg Speyer Hausse zu Frankfurt a.M* 1928 No 21 pp 362-371 With 2 text figs [11 refs] [State Inst. for Exper Therap & Municipal Hyg Inst Univ Frankfurt a.M]

The synthetic medium used had the composition ammon. chloride, 0.5 sod. sulphate 0.5 mag sulphate 0.01 di-hydrogen pot phosphate, 0.05 di pot. phosphate, 0.15 sod. lactate 0.5 twice distilled water to 100 with pH 6.8 to 7.2. The culture in this medium was killed with toluol, centrifuged, and the centrifugate and sediment separately tested by intravenous injection in rabbits. The centrifugate was toxic and the sediment was not. But it is not justifiable to conclude from this that the bacteria are not themselves toxic, for with long incubation some are dying and their toxin would then be found in the medium. Death and dissolution of the bacteria are promoted by the addition of the toluol. This point is elucidated by the following experiment. Incubation of the cultures was for 3 days and 6 days. The 3-day and 6-day cultures were first separated into centrifugate and sediment and the toluol then added. When this procedure was followed both the centrifugate and the sediment were found to be toxic. But if the toluol was added to the 6-day culture before centrifuging the centrifugate showed itself toxic while the sediment was not. The conclusion is reached that Shiga Kruse bacilli produce intracellular toxin in a lactic acid ammonium medium and that this toxin only appears in the medium with the death of the bacilli.

W F Harvey

BLAKE (Adelaide V) & OKELL (C C) Seasonal Variation in the Susceptibility of Mice to Dysentery (Shiga) Toxin.—*Brit J Experim Path* 1929 Apr Vol 10 No 2 pp 175-179 With 1 chart in text. [8 refs] [Wellcome Physiol. Research Labs. Beckenham, Kent]

Variability does not affect the titration of diphtheria antitoxin to any serious extent because the test dose of toxin contains so many lethal doses. It is different with titrations of dysentery (Shiga) toxin and antitoxin. In this case a test dose of toxin as defined by the League of Nations, is the amount of toxin which, when mixed with one unit of Copenhagen standard serum (0.005 cc.) and injected intravenously into a group of mice will kill 33 per cent. and with 2/3 unit of standard serum will kill 66 per cent. Variations in mortality have been followed out by the authors for groups of 20 mice injected with a constant toxin-serum mixture at frequent intervals between November of one year and December of the following year. The test toxin used (3A) consisted of the dried intact bodies of the Shiga

bacillus. A variability was found and is shown by means of a chart of average monthly percentage mortalities. Susceptibility appeared to be greatest during the first quarter of the year and to show a marked fall between June and October. A variation of this order can easily lead to titrational error. If, however, the test dose of toxin be increased, as already suggested by the authors, the errors due to variations in susceptibility of mouse groups should be reduced to insignificant proportions.

W. F. Harvey

MADSEN (Th.) & JENSEN (K. A.) *Standardization of Dysentery Sera.*
—*Acta Med Scandinavica* 1929 Vol. 70 No. 5/6 pp. 430-435 [State Serum Inst. Copenhagen.]

Some of the questions which have arisen at the various conferences on the subject of standardization of dysentery serum are set out. Was the anti-infectious or the antitoxic effect of the serum to be the basis of measurement? Was the toxin to be regarded as made up of different components such as endotoxin (enterotoxic) and exotoxin (neurotoxic) and were there specific antibodies to such component antigens? Were mice or rabbits the best animals to use and ought the injections to be subcutaneous, intraperitoneal or intravenous? A very considerable degree of agreement has been reached on controversial points. As uniform results had been attained with dried bouillon toxin, killed bacteria, Vollgift, autolyzed bacteria, etc. it was decided to use only dried bacteria prepared in a definite way. Mice of 16 to 18 gm. were to be used and were to be injected intravenously with a mixture of toxin and serum (0.5 cc.) after standing one hour at 37° C. Lastly just as in the case of diphtheria a dried serum was to be the standard of measurement and not the toxin. Some divergent results have been found to depend on fluctuations in the resistance of the mice used and on the season at which experiments were performed. For these reasons it is evident that the mice used should at least be of the same age and of the same breed. The standard serum is a Shiga-kruuse serum. At the State Serum Institute in Copenhagen a large quantity of dried standard serum is now kept *in vacuo* with a strength of 20 000 units per gramme. The unit is an arbitrary one and so fixed that 10 cc. of an average serum contain about 5 000 units. A standard solution containing 200 units per cc. is sent out four times a year to accredited institutes throughout the world and with this they adjust the test toxin used in measuring the strength of commercial sera.

W. F. Harvey

MUNTON (J.) *Agglutinins to B. dysenteriae in the apparently Healthy*
—*Brit. Med. J.* 1929 June 22. pp. 1115-1117 [3 refs.]

The technique of DREYER was used and each serum was tested against Shiga's bacillus, Flexner's bacillus of types V, W, X, Y and Z, Sonne's bacillus and, as controls, against *Br. abortus* (Bang). A total of 524 serums was examined, half male and half female, with the result that positive findings were obtained in 16 males and 17 females. Only one of the individuals tested gave a history of dysentery 30 years previously. Although the males reacted most frequently to Sonne's bacillus (8 individuals) the highest titres were to types V, W and Z.

of the Flexner group. The females reacted most frequently (15 individuals) to type V Flexner. In the Medical Research Council Special Report No. 51 it is stated that 10 standard agglutinin units per cc. in a man and 20 in a woman are practically diagnostic of active infection by the bacillus agglutinated and that 6 to 8 units in a man and 12 to 16 in a woman indicate a high probability of dysenteric infection, provided always the individual has not had the disease and has not been inoculated. The standard laid down although very helpful is not absolute for active dysentery cases may not show the required titre and apparently normal individuals may show a higher titre. But the evidence now available suggests that these so-called normal agglutinins are a residual index of previous mild attacks of dysentery which may have been ignored and have remained undiagnosed.

W F Harvey

GRASSMÜCK (Elise) Vergleichende Untersuchungen über die Wirkung durch Hitze und Yatren abgetöteter Ruhrvakzins [Sterilization of Dysentery Vaccine by Heat and by Yatren.]—*Zentr f Bakt I Abt Orig* 1929 May 28 Vol 112 No 3/4 pp 232-243 With 5 graphs in text [16 refs] [Children's Clinic Univ Leipzig]

Yatren which is an iod-oxychinolin-sulpho-acid, in 0.25 to 2 per cent. solution is compared with a water bath temperature of 37° C. for one hour in respect of sterilizing action and influence upon antigenic potency of dysentery vaccine. The results show that no difference can be found between them except that yatren has the advantages of easier application and of continued preservative action. The agglutinin content of the immune sera is the same whatever the mode and duration of sterilization and so are the general and local reactions produced.

W F Harvey

LURJE (M) ROSENBLATT (A.) & KOSSAREW (N) Die Dysenterie-Anavakzine Shiga Kruse und ihre vakzinierenden Eigenschaften. [Properties of Shiga-Kruse Dysentery Anavaccine.]—*Ztschr f Immunitätsf u Experim Therap* 1929 Vol 61 No 1/2 pp 130-136 [7 refs] [State Inst for Microbiol & Hyg Baku (Azerbaijan)]

The difficulties of prophylactic vaccination with Shiga Kruse organisms owing to the toxic reaction they set up are well known. An anatoxic vaccine seems to afford a solution of this difficulty. The authors used a strain which after sterilization at 60° C killed rabbits of 1 700 to 2,000 gm. with doses of 250 million in 5 days while 1 000 million killed in 16 hours. Vaccine suspensions were made up to the strength of 2,000 million organisms per cc. It was found that such a vaccine after treatment with a concentration of 0.5 per cent. formalin at 39° C for 21 days did not affect rabbits on intravenous injection of 8 000 million organisms. The antigenic properties of this vaccine were satisfactory both as regards the production of high agglutinin titre (1 in 3 000 to 4 000 macroscopic) in rabbits sera and protection against the lethal toxic dose of 1 000 million organisms. Rabbits

showed reaction to large doses of the vaccine by a rise of temperature of 1 to 2° C. which was of short duration and by loss of weight which might reach 10 per cent. Eleven men were tested with serial doses of 1 2 and 3 000 million organisms administered subcutaneously at intervals of 5 days and showed only a slight local reaction.

W F Harvey

DEWYS (P) Mutation d'un bacille dysentérique de Hiss sous l'influence de passages successifs dans du sérum anti-correspondant. [Mutation of a Hiss Dysentery Bacillus with Culture in Homologous Antiserum.]—*C R. Soc Biol* 1929 June 14 Vol. 101 No. 20. pp. 507-508. [2 refs.] [Path. Inst. Louvain.]

The bacillus used gave smooth colonies on agar and uniform turbidity in broth it was a typical S form. The first culture in bouillon, containing 10 per cent. antiserum showed a growth agglutinated at the bottom of the tube and a clear supernatant medium. The second passage produced a few granular masses floating in the bouillon and these increased with subsequent passages. By the 28th passage transformation to the R form was complete the bouillon culture was granular the colonies on agar were rough and the bacilli were not agglutinated by anti S serum. Colonies on agar from the 18th passage were mostly of S type but showed a few (4 per cent.) colonies of quite different appearance. The latter were small, indented, of very irregular outline, transparent and fluid, and showed exceedingly polymorphic bacterial elements. With the 19th passage there were 35 per cent. of these colonies 40 per cent. with the 20th, 20 per cent. with the 21st, 3 per cent. with the 22nd, and none thereafter. These colonies, when further subcultured on agar gave a mixture of similar colonies and colonies of S and R types. This colony then represents an unstable form intermediate between S and R forms.

W F Harvey

DEWYS (P) Mutation d'un bacille dysentérique de Hiss sous l'influence d'un principe lytique. [Mutation of a Hiss Dysentery Bacillus with Subjection to a Lytic Principle.]—*C R. Soc Biol* 1929. June 14 Vol. 101 No. 20 pp. 509-510. [3 refs.] [Path. Inst. Louvain.]

The lytic principle used, which had been isolated from the faeces of the cow was weak and could not be exalted in virulence. Five cc. of bouillon of pH7.8 made slightly turbid with some drops of young culture of pure S type, had added to it 5 drops of lytic principle and the mixture was placed in the incubator at 35° C. Subcultures on agar were made at intervals. The bouillon mixture began to clear after 1½ hours was perfectly clear in 3 hours and showed the development of secondary culture between the 5th and 8th hour. Subcultures made after 30 minutes in the incubator showed upwards of 100 colonies, many of which were notched and eroded after 1 hour one colony of type S after 2 hours no colonies, after 3 hours 6 colonies, after 5 hours 3 colonies 2 of which were of intermediate type after 13 hours hundreds of colonies, but none of intermediate type were obtained. With 30

hours incubation most of the colonies had a glassy appearance and gave rise to daughter colonies of golden yellow colour and smooth form. The daughter colonies when subcultured gave a pure growth of the intermediate type. This type, intermediate between S and R forms obtained by the action of a weak lytic principle was in every respect identical with that obtained by growth in antiserum (this *Bulletin*)

W F Harvey

LARGE (D T M) *Dysentery in the Lahore Military District.—Indian J Med Res* 1929 Apr Vol. 16 No 4 pp. 1128-1138
With 2 charts in text [9 refs]

A detailed account of an interesting and valuable investigation whose results show that —

- (1) Bacillary dysentery in Lahore military district is very much commoner than amoebic, forming some 80 per cent. of the total dysentery
- (2) While present throughout the year its incidence increases markedly in warm months before the real hot weather and immediately following it.
- (3) It has been usually very mild in type in 1925 to 1927 even in Shiga infections. Some Flexner infections had only one day's diarrhoea with blood and mucus in stool.
- (4) In Lahore bacillary dysentery occurs as—Flexner infections 74.1 per cent. Sonne 13.3 per cent. and Shiga or Schmitz 12.6 per cent.
- (5) Agglutination tests in the case of dysentery require incubation for 16 hours at 56 C. It was found convenient to leave them overnight in the water bath
- (6) Diagnosis of Sonne dysentery requires a high titre serum made from a circular smooth colony of this organism or preferably two sera, one from the said colony and another from the crenated late colony
- (7) An originally large group of inagglutinable Flexner organisms was found on retention for a year in laboratory to have become agglutinable to a small extent with Flexner sera and then to be capable of producing a serum which agglutinated various bacilli of the Flexner group in some cases in high titre

H M. H.

BERND (Mario) *Notulas sobre dysenteria bacillar no Rio Grande do Sul. Contribuição ao symposio anhydro sobre dysenterias, effectuado em uma das sessões de Sociedade de Medicina de Porto Alegre. [Jottings on Bacillary Dysentery in Rio Grande do Sul].—Scienca Med* 1929 May Vol. 7 No 5 pp 250-254 [6 refs.]

The author discusses with running comments the subject of bacillary dysentery its epidemic incidence in certain towns of the Brazilian state of Rio Grande do Sul, the question of carriers of dysentery bacilli who show no symptoms of the disease its seasonal prevalence and the probabilities of its being a water borne disease. He touches upon the use of autogenous bacteriophage and autogenous vaccine in treatment and upon the agglutination titres which are diagnostic for Shiga bacilli on the one hand and Hiss and Flexner bacilli on the other

W F Harvey

ELKELES (Gerhard) Zur Klinik und Bakteriologie der E-Dysenterie
[Clinical and Bacteriological Characters of E-dysentery].—*Deut. Med. Woch.* 1929 Mar 8 Vol. 55 No. 10 pp. 393-394.
[4 refs.]

This critical discussion has been prompted by the occurrence of epidemics of dysentery in which the E bacillus of Kruse figured prominently as the cause. Out of 178 cases of positive diagnosis of dysentery there were 141 E dysentery cases, while out of 133 E cases 87 had blood and mucus in the stools, 40 had mucus, 4 were simply diarrhoeic and 2 mothers of sick children had normal stools. On the whole E dysentery is a mild affection. It can occasionally simulate appendicitis. Bacteriological characters of this bacillus—often called the Sonne bacillus—are set out in some detail. The author strongly advocates the abandonment of the old classification of dysentery organisms into Flexner and Strong types which he maintains do not correspond to real units. A much better method of classification is that according to the letters of the alphabet as adopted by Kruse, which gives types extending from A to J. Finally all these organisms from the Shiga Kruse to the J type should be called true dysentery bacilli and the term pseudodysentery abolished altogether.

W F Harvey

NORMET (L.) URBAIN (Ach.) & CHAILLOT (L.) Sur un bacille du groupe des *Salmonella* provoquant chez l'homme des dysenteries et des diarrhées cholériformes. [A *Salmonella* Organism causing Dysentery and Choleraic Diarrhoea in Man].—*C. R. Soc. Biol.* 1929 July 5 Vol. 101 No. 23 pp. 752-753

This bacillus isolated during an epidemic of dysentery in Annam, is considered by the authors to be the cause of the condition. It has the morphological and cultural characters of a *Salmonella* organism, possesses a variable virulence and secretes a toxin which may kill a 2 kgm. rabbit in a few hours upon intravenous injection of 0.1 cc. of filtrate of a 48-hr culture. It is not agglutinated by typhoid, paratyphoid, dysentery, Aertrycke or Gaertner sera and its own specific antiserum is devoid of action on typho-coli and dysentery bacilli.

W F Harvey

CLAYTON (F. H. A.) & WARREN (S. H.) An Unusual Bacillus recovered from Cases presenting Symptoms of Dysentery.—*Jl of Hyg.* 1929 Feb Vol. 28 No. 4 pp. 335-362. [6 refs.] [Bact. Lab. Univ. Durham & College of Med. Newcastle upon-Tyne.]

The organism was originally isolated from a healthy girl whose only complaint was of slight abdominal pain and headache for one day but whose whole family had suffered from diarrhoea 6 weeks previously. It had the character and reactions of *Bact. dysenteriae* (Shiga) but did not agglutinate with antisera prepared from the dysentery and paratyphoid bacilli and from *Bact. paratyphosum*. Other organisms identical with the first isolated were obtained from four separate outbreaks of illness with dysenteric symptoms. These strains fermented glucose and maltose with the production of acid and usually failed to ferment lactose, mannite, dulcitol and saccharose in peptone water. A trace of gas was rarely produced from glucose and occasionally slight acid and gas from dulcitol. But if Lemco broth were used as the

basis for fermentation of carbohydrates it was found that the organism produced acid and gas with glucose, dulcitol and maltose. The serum of patients when available agglutinated the test organism. The authors conclude with the finding that— On the whole therefore the evidence suggests that these organisms may be responsible for the diseased condition.

W. F. Harvey

FICHERA (Salvatore) *Dissenteria da bacillo Ceylonensis* [*Dysentery due to Bact. ceylonense*].—*Policlinico Sez. Prat.* 1929 Apr. 22. Vol. 36 No. 16 pp. 550-552. [4 refs.] [Med. Clinic Univ. Catania.]

The author sets out the distinguishing characters of the metadysentery group of bacilli as described by CASTELLANI. He gives clinical details of a case in which the serum reaction was negative for Shiga kruse, Flexner Strong Hiss-Russell Gartner and *coli* but strongly positive in a dilution of 1 in 900 for *Bact. ceylonensis* A.

W. F. Harvey

GILBERT (Ruth) & COLEMAN (M. B.) *Cases of Dysentery in New York State attributed to B. dysenteriae Sonne*.—*Amer. J. Pub. Health* 1929 Mar. Vol. 19 No. 3 pp. 312-313. [4 refs.] [New York State Dept. of Health Albany.]

In the space of a few months 12 strains of the Sonne bacillus have been isolated from faeces of persons reported as suffering from more or less severe dysentery. It seems probable that this strain is more prevalent than has hitherto been realized.

W. F. Harvey

MUGGLA (A.) *Un cas de dysenterie par bacille para-dysenterique* [*A Case of Dysentery caused by a Paradysentery Bacillus*].—*Bol. Scienze Ital. Soc. Internaz. di Microbiologia* 1929 May. Vol. 1 No. 5 p. 106. [Inst. of Bact. & Immunol. Univ. Turin.]

A woman, aet. 30 years had suffered for two years from recurrent diarrhoea, sometimes blood-stained, asthenia, fever, flatulence, tenderness of abdomen—a chronic colitis. No Koch's bacillus found. After repeated platings of stool, a bacterium was grown which had the following characters—non-motile, gram negative, milk—O, lactose—O, glucose—A, maltose—O, saccharose—A, mannite—A, inuline—O, dextrine—O, laevulose—A, galactose—A. It therefore belonged to Castellani's paradysentery var. Hiss-Russell group. It was agglutinated by the patient's serum in 1:200 dilution and not at all by anti-Shiga and anti-Flexner sera. A vaccine made from it provoked after injection into the patient rigor and high temperature but was followed by great clinical improvement. Stool examination months later was negative for the germ.

H. M. H.

GREPPI (Luigi) *Sulle complicanze della dissenteria bacillare dell'infanzia*. [*The Complications of Bacillary Dysentery in Children*].—*Pediatrics* 1929 June 15. Vol. 37 No. 12. pp. 635-646. [23 refs.]

Eleven cases are detailed in children aged between 7 months and 15 years. Eight of these were Shiga infections, in three the type is not

stated. Three suffered from a complicating arthritis, one of them with a marked urethritis. Four had definite signs of renal mischief—albumin and casts—three presented considerable oedema although examination of the urine revealed no abnormality. One had a pyelocystitis.

H. Harold Scott.

BACHMANN (Norberto) Yatrenklistiere als rasch heilende Behandlung der Bazillenruhr [Enemas of Yatren a Rapid Cure for Bacillary Dysentery]—*Arch f Schiffs u Trop Hyg* 1928. June. Vol. 32. No. 6. pp. 327-328.

The author briefly records with emphasis and enthusiasm the startlingly rapid clinical cure of bacillary dysentery in Joinville, Brazil, by clysters of yatren 105. He gave twice daily a rectal injection of yatren 2, to warm water 200 cc. as a rule, but to children and the weaker exhausted adult patients 20 cc. of the same strength. The clyster had to be retained for as long as possible. Number of cases is not given—no failure is recorded.

H. M. H.

WELCH (T. B.) The Castor Oil Treatment of Acute Bacillary Dysentery—*Jl Port-of-Spain Med Soc* 1927 pp. 53-62.

The author recounts his experience in Trinidad and in Kenya Colony with MASCARENHAS [this *Bulletin* Vol. 22, p. 20]. Treatment is as follows. On day of admission to hospital the patient is given 2 oz. of castor oil, (or 1 oz. if his condition is poor) on second and third days 1 oz. hourly by day. These courses were then repeated until the patient had had one complete course after that in which he had passed mucus. Little or no restriction of diet.

The author claims for this régime—simplicity—a very greatly reduced death rate—actual duration of symptoms in the first instance not long—relapse unusual and very mild—convalescence prompt—the patients lose little in condition—no patient had developed chronic or asthenic dysentery—abdominal pains absent or slight, defaecation not exhausting and daily number of stools not large. Boase has tried this treatment in Uganda [*loc. cit.* Vol. 23 p. 379] and found it equally effective.

H. M. H.

MIXED AND UNCLASSIFIED DYSENTERY

LOGANADAN (A. D.) assisted by FERNANDEZ (E. C.) Report on Dysentery in Kohat District.—*Jl Roy Army Med Corps* 1929. Apr. Vol. 62. No. 4. pp. 277-279.

The authors note that HEATLY SPEKCEK had reported as bacillary over 70 per cent. of the dysentery in Baluchistan Plateau. They comment that in spite of the fact that *Entamoeba histolytica* cysts are quickly killed by desiccation, it has been frequently stated that amoebæ is the commonest type of dysentery in dry hot dusty areas.

They now report results of a year's work among British and Indian troops in cantonment (ordered sanitation with pure water supply and no fly-breeding) close to Kohat ("a city submerged in filth, breeding flies in numbers and broadcasting dysentery"). By Manifold's technique—of 137 dysentery cases, 114 showed typical bacillary exudate

alkaline to litmus from which were isolated B Flexner 69 cases B. Shiga 27 B Morgan 3.

Twenty three cases showed indefinite exudate of which 1 was acid, 3 neutral and remainder alkaline

Among 5 cases of amoebic infection *E histolytica* was twice seen in blood and mucus together with exudate of bacillary type alkaline to litmus and three times in indefinite exudates alkaline to litmus. All 5 cases gave history of being infected outside Kohat district.

Of 24 cases of diarrhoea examined, 6 gave B Flexner Shiga were rather more toxic than Flexner infections. Treatment by salines was instituted promptly on the quickly obtained advance report on the exudate and all cases ran a benign course. All the Shiga strains agglutinated with standard Oxford serum whereas most of the Flexner strains were magglutinable by polyvalent Oxford serum. Out of the 69 Flexners eight were late lactose fermenters—Sonnes group In one case B Flexner was isolated in the second day of illness *E histolytica* and ova of *Schistosoma mansoni* found on the eighth day The patient had served in Egypt for 3 years 8 years ago

H. M. H.

PERRY (H. Marrian) & BENSTED (Harold J.) *Investigations in Egypt of Some Acute Bacillary Intestinal Infections.*—*Trans Roy Soc Trop Med & Hyg* 1929 Apr 25 Vol 22 No 6 pp 511-522. With 1 chart [11 refs.] [Public Health Labs Cairo]

This paper is based on the results of the last two years investigations of bacillary intestinal infections in Egypt. The authors note however that no true index of the incidence of these infections can yet be obtained.

Typhoid and Paratyphoid—Mortality is 30 to 40 per cent. amongst reported cases. Sporadic distribution points to food contaminated by carriers or flies, rather than to water as vector 250 000 inoculations have been carried out. A certain number of severe reactions following inoculation are shown to be due to use of very recently prepared vaccine. They diminished in intensity in direct ratio to length of time that vaccine had been stored.

Laboratory investigation

1	Number of Sera Examined	5 449
	Number showing Evidence of Inoculation Agglutinins	296
	Number of Uninoculated Cases giving Definitely Positive Reactions	1,346
	Typhoid	930 or 69.1 per cent.
	Paratyphoid A	198 or 14.8 per cent
	Paratyphoid B	218 or 16.1 per cent
	Positive Weil-Felix Reactions	174
2.	Faecal Isolations in 50 cases —	
	<i>Bacillus typhosus</i>	34 or 68 per cent
	<i>B paratyphosus A</i>	6 or 12 per cent.
	<i>B paratyphosus B</i>	10 or 20 per cent
	In 1916 the late Dr BEATON found among Cairo civil population —	
	Typhoid	152 or 79.6 per cent.
	Paratyphoid A	13 or 6.8 per cent
	Paratyphoid B	26 or 13.6 per cent

Paratyphoid B and to less extent A infections sometimes simulated acute dysentery—the stools containing blood and mucus. This is more common in children. Repeated outbreaks of typhoid and para

typhoid fever amongst convicts in Tantah prison were shown to have as source four carriers in kitchen personnel. Two of these were passing *Bact. typhosum* and two *Bact. paratyphosum B*. Epidemic ended with removal of these carriers.

The Dysenteries.—Warmer months of year May to November are accompanied by occurrence of cases of entero-colitis—mild diarrhoea to typical dysenteric attack with tenesmus and blood, pus and mucus in stools. Investigations revealed a very definite correlation between maximum appearance of flies and occurrence of dysentery in both adults and children. In stools, a preliminary cytological examination was always made, even if vegetative forms of *E. histolytica* were demonstrated by microscopical examination, and the stool was then plated on differential medium.

Dysentery in adults.—The majority examined were Europeans or Egyptians of the upper classes. [The authors note, what Egyptian medical men have recorded, that the "fellah of average intelligence" is little disturbed by an attack of diarrhoea or dysentery—he may seek medical aid for some other complaint and not mention that he is passing almost pure blood and mucus per rectum.]

In adults with clinical dysentery				Cases
Dys. bacilli of non-mannitol-fermenting group—				3
<i>Bact. dysenteriae</i> Shiga	..	..	..	3
Dys. bacilli of mannitol-fermenting group—				61
<i>Bact. dysenteriae</i> Flexner	..	..	..	12
<i>Bact. dysenteriae</i> Sonne	..	..	..	6
B. Morgan	..	..	..	9
B. Schmitz	..	..	..	1
<i>Bact. paratyphosum A</i>	..	..	..	2
<i>Bact. paratyphosum B</i>	..	..	..	16
<i>Endamoeba histolytica</i>	..	..	..	3
Mixed infections with both <i>E. histolytica</i> and <i>Bact. dysenteriae</i> Flexner				3

The *E. histolytica* infections were based invariably on presence of active vegetative forms. It had once been usual to claim most of the dysentery of Egypt as amoebic—in fact, it is seen to account for not more than 12 per cent.

Dysentery in children.—Accounts for a high death rate among them. The official records 1927 give death rate under 5 years age, from "gastro enteritis" as 100.9 per thousand. The very great majority of these deaths occur in the warmest month, July. The authors' investigation was for the most part (93 per cent.) amongst the poorest children.

Examination of mucoid or liquid stools from 526 young children and infants gave—

				Cases
Dys. bacilli of non-mannitol-fermenting group—				47
<i>Bact. dysenteriae</i> Shiga	..	..	..	47
Dys. bacilli of mannitol-fermenting group—				212
<i>Bact. dysenteriae</i> Flexner	..	..	..	28
<i>Bact. dysenteriae</i> Sonne	..	..	..	56
B. Morgan	..	..	..	3
B. Schmitz	..	..	..	11
<i>B. pyocyaneus</i>	..	..	..	7
<i>Proteus vulgaris</i>	..	..	..	6
<i>Bact. paratyphosum B</i>	..	..	..	3
<i>E. histolytica</i>	..	..	..	41
Flagellates (<i>Giardia</i> , <i>Trichomonas</i> , <i>Chilomastix</i>)	..	..	..	12
Mixed infections with both <i>E. histolytica</i> and <i>Bact. dysenteriae</i> Flexner				12

In 77 per cent. no accepted pathological agent was demonstrable—the stools were liquid, devoid of blood or mucus but contained flagellates in enormous numbers—*Trichomonas hominis* *Chilomastix mesnili* or *Giardia lamblia*. In all recorded investigations in endemic dysentery areas it is noteworthy that infections due to Flexner bacillus have been found to be much more common than those due to Shiga bacillus. KLIGLER found that in septic tanks bacilli of typhoid-dysentery group were rapidly destroyed by the high alkalinity (pH 8.8-9.0) of effluent, and that Shiga bacillus succumbed most rapidly. Further in dry privies reaction of soil was of utmost importance, determining viability of these bacteria, which was much shortened in acid soils (pH 4.8-5.0) in this case also Shiga bacillus was found to be more sensitive to these changes in reaction.

The rest of the paper deals with food poisoning

H. M. H.

OLITZKI (Leo) & REICH (Karl) Untersuchungen ueber Amöben und Bazillenruhr in Palästina. [Investigations of Amoebic and Bacillary Dysentery in Palestine.]—*Zent f Bakt I Abt Orig* 1929 June 28 Vol. 112. No 6/8 pp 507-519 [3 refs] [Hvg Inst. Hebrew Univ Jerusalem]

The authors note that WENYON MANSON BAHR, CUNNINGHAM and other workers have shown bacillary to be the commoner dysentery, as compared with amoebic in the Near East. W BRUNN (1920) confirmed this finding for Palestine. In this long paper the authors record fully with data presented in many tables, the result of their investigation of dysentery in Palestine.

Bacillary dysentery shows two epidemic peaks, one in spring and the second in autumn. The authors state that these are seasons when the populace including the children are prone to a non-infectious diarrhoea. The bacillary dysentery cases were usually acute with muco-sanguineous stools. About 20 per cent. of all cases were in children $\frac{1}{2}$ to 2 years old.

Amoebic dysentery Most cases were diagnosed in midsummer a season, they state when there is but slight tendency to diarrhoea. The amoebae were very often found in normal or nearly normal stools. The question arises if these were new or chronic latent infections. Only about 3 per cent. of cases occurred among children $\frac{1}{2}$ to 2 years old.

Other gut protozoa—Flagellates were found mostly in children 1 to 3 years old. Non pathogenic amoebae were found mostly in adults. A noteworthy finding was cyst carriers in Tiberias 20 per cent. in Tel-aviv 3 per cent.

H. M. H.

FETTWIS (Minna) Beiträge zur sogenannten nodulären Ruhr [So-called Nodular Dysentery]—*Frankfurter Ztschr f Path* 1928 Vol. 36. No 1 pp 113-122. [6 refs.] [Path. Inst Med. Academy Düsseldorf]

Describes and discusses very fully histological investigation of the nodules found in the dysenteric gut wall. The author concludes that the small suppurating foci in the submucosa are probably caused by secondary invading bacteria. The base of these foci is a lymph follicle or often the submucosal connective tissue. These small submucosal abscesses form eventually the large flask shaped ulcers.

H. M. H.

WEITMAN (I) Note on Rivanol in Treatment of Dysenteries.—*Trans. Roy Soc Trop Med & Hyg* 1929 June 25 Vol. 23. No. 1. p. 101 [1 ref.]

The author notes that the brilliant results obtained with rivanol as reported by WAGNER, SCHAUHANN and PETER [see above] aroused hopes of enrichment of the arsenal of antidyenteric remedies. He therefore tried the drug in —

(1) Four cases of dysentery in which vegetative amoebae were present, as verified by staining with iodine and with haematoxylin, and by microscopical examinations twice daily. 0.05 gm. of rivanol dissolved in an ounce of thick syrup was given thrice daily and once at night. After 6 days of this treatment number of stools had not diminished vegetative forms were still present and as active as before. On seventh day rivanol was omitted and under other routine treatment the cases "cleared up immediately."

(2) Three cases of *Shiga bacillus* and eighteen cases of *Flexner bacillus* dysentery. Not the slightest effect could be noted in the former. In the latter except for those mild ones that would have recovered anyhow he had after seven days to discontinue rivanol and revert to "routine treatment."

(3) Two cases of lambliosis—rivanol per os was without the slightest effect.

However in many of these cases [presumably of dysentery] rivanol had a mild sedative effect."

H. M. H.

MÜLLERS (P) 8 Jahre Yatrenbehandlung der Amöben- und Bakterien-dysenterie und ihrer Folgen. [Eight Years Yatren Treatment of the Dysenteries and its Results].—*Deut Med Woch* 1929 Jan. 11 Vol. 55 No. 2. pp 49-53. With 7 charts in text. [1 ref.] [Inst for Ship & Trop Diseases Hamburg]

This paper is itself a summary account of the favourable experiences of yatren of various authors in many countries during the last 8 years in the treatment of dysentery. The author sums up his summary—that to-day yatren 105 is the best remedy for acute and chronic amoebic dysentery at all ages and for its sequelae, e.g. colitis ulcerosa membranacea, spastic obstipation and for cyst passers without symptoms. Some cases do best on yatren by mouth, others on yatren per rectum and others again by combining these two methods of administration. Clinical symptoms, and *E. histolytica* and its cysts disappear in a few days after the start of yatren treatment. Yatren also rapidly causes disappearance of the "minuta" forms of *E. histolytica* and also *E. coli*, *Endolimax nana*, *Iodamoeba* and *Balantidium coli*. Yatren gives uncertain and impermanent results with *Lamblia* and *Trichomonas* infections—but better results with *Blastocystis*, *Councilman* and *Chilomastix*. In bacillary dysentery notably in *Shiga* acute infection and its sequelae yatren has procured noteworthy cures. In various regions yatren has proved an effective prophylaxis against dysentery (2-4 pills a day twice a week). Yatren has been shown everywhere to be nontoxic in daily doses of 10-12 gm. even 15-30 gm. or in dyster has proved therapeutically effective.

H. M. H.

JACOBY (Curt) Ueber Spirocid bei Behandlung von Amöbendysenterie und ruhrähnlichen, durch andere Protozoen hervorgerufenen Darmerkrankungen. [Spirocid in the Treatment of Amoebic Dysentery and Other Protozoal Intestinal Affections.]—*Arch f Schiffs u Trop Hyg* 1929 Mar Vol. 33. No. 3. pp 135-152. [12 refs]

The author describes fully his observations on the effect of treatment by spirocid (4-Oxy-3-acetylaminophenylarsin-acid) of 70 cases, 28 women and 42 men. Tablets of 0.25 gm. were given by mouth usually three times a day. 49 were cases of infection with *Entamoeba histolytica*, 8 of *E. histolytica* and *Trichomonas*, one case of clinical amoebic dysentery and *Trichomonas*, 3 cases of *Lambia*, 2 cases of *Lambia* and *Trichomonas*, and 13 cases of *Trichomonas* infection. 60 cases responded quickly by relief of symptoms, disappearance of the parasites from stools and return of stools to normal appearance, after spirocid treatment for 3 to 4 days. Treatment was given for one week. Of the remaining 10, 1 case developed spirocid intoxication—dermatitis and fever (the author records that this toxic manifestation has occurred far more frequently in his hands when using stovarsol). Of the 9 others, only 1 responded well to emetine. The remaining 8 were treated with various dysentery remedies, but showed only slow recovery. In these 10 spirocid-resistant cases were 4 of *E. histolytica* and *Trichomonas* infection. Seven were women who with the three men were all in very weak and wasted condition at commencement of spirocid treatment. The author found spirocid to be effective in getting rid of *Lambia* and *Trichomonas* infections.

H. M. H.

CHOUDHURY (B. K. Pal) & MORISON (J) The Spread of Dysentery in a Khasi Village and its Treatment with Bacteriophage.—*Indian Med Gaz* 1929 Feb Vol. 64 No. 2. pp. 66-67 [Pasteur Inst. Shillong, India.]

Investigation showed that the epidemic was in all probability water borne. The hillside pool from which drinking water was led by a bamboo pipe was continually infected by pigs that had fed on dysenteric stools. When the pool reservoir was fenced round the epidemic ceased. 43 samples of stool were sent to the Pasteur Institute Shillong—a 24 hours journey—yet *Bact. dysenteriae* Shiga was isolated three times and Flexner four times.

The object of Dr. Choudhury's visit was to test use of bacteriophage under village conditions. Six villagers were each placed in charge of five houses and the bacteriophage diluted with water was sent round in bottles. 2 cc. in 4 oz. water was given to every sick person on the first day three times and subsequently twice daily. They were given water *ad lib* but the only diet available was boiled rice and water paste.

	Severe	Moderately severe.	Mild.
Number of cases	18	19	43
Deaths	3	0	0

H. M. H.

- KRIEG (F) Chronische Gelenkerkrankungen nach Infektionskrankheiten. I Chronische Gelenkerkrankungen nach Ruhr [Chronic Joint Affections after Dysentery]—*Ztschr f Wissenschaftl Bäderkunde* Berlin. 1927 July Vol. 1 No 10 pp. 606-616.

The author describes cases of chronic rheumatism and arthritis after dysentery and their treatment by the Baden Baden cure including special baths. He has found that the cases give agglutination reaction over long periods with dysentery bacilli, thus establishing their etiology. The most severe cases are due to Shiga toxin strains. The cases show definite anaemia and atrophy, the clinical picture resembling acute anterior poliomyelitis. The arthritis of bacillary dysentery is a febrile illness of long duration and obstinate symptoms. There is usually polyarthritis especially of lower limbs. The disease picks out serous cavities and mucous membranes such as conjunctiva and urethra. The clinical picture is that of infectious exudative polyarthritis. In contrast to what occurs in acute rheumatism, the heart is seldom affected. Salicylates are without effect on the illness.

H. M. H.

- ONGKIEHONG (H. F.) Santoninebehandeling bij Balantidiasis. [Santonin Treatment in Balantidiasis].—*Geneesk Tijdschr v. Neder Indie* 1929 Jan 21 Vol. 69 No. 1 pp. 62-64 4 refs.]

Three cases of balantidiasis were treated with santonin, 3 times per day 25 mgm. on 2 consecutive days. In two cases (a light diarrhoeic one and a dysenteric one) the treatment yielded a quick and favourable result. In another patient, suffering from pulmonary tuberculosis, the santonin cure failed, probably the parasites were settled in deep (tuberculous?) ulcers of the gut, they finally disappeared after a yarrow cure. In a previous case of the author's and in one of Buro's santonian treatment was efficacious. The author considers it an important addition to our therapeutic arsenal.

W. J. Bak.

- BERGHEITI VALENTINI (Fabiano) Accesso epatico da dissenteria amebica nota nella cavità peritoneale e guarito con l'operazione.—*Pediatrics Soc. Prat.* 1929 Aug 5 Vol. 36. No. 31 pp. 1095-1000 With 1 text fig. (8 refs.)
- BUCHHOLZ (Leo) Klinische Besonderheiten der Ruhr im Stänglingsalter.—*Moskowsk. / Kinderheilk.* 1927 Vol. 36. pp. 351-357 (8 refs.)
- CASTELLANI (Aldo) A New Strain of the Metadysentery Bacilli.—*Proc. Soc. Experim Biol & Med.* 1929 Apr Vol. 26. No. 7 pp. 343-346 (1 ref.) [Dept of Trop Med. Tulane Univ. New Orleans]
- DA CUNHA (Amatado Marques) & MULLER (Julio) Consideraciones sobre Entamoeba Hartmanni.—*Prensa Med. Argentina.* 1929 Apr 30 Vol. 13 No. 33. pp. 1454-1460 With 4 text figs. [Oswaldo Cruz Inst., Rio de Janeiro]
- DAVIS (Oscar) Amebic Abscess of the Liver rupturing through the Lung. Report of an Unusual Case.—*U S New Med. Bull.* 1929 Jan Vol. 27 No. 1 pp. 130-132.
- DAVIS (W. D.) Report of an Epidemic of Dysentery.—*U S New Med. Bull.* 1929 Apr Vol. 27 No. 2 pp. 332-336
- ERSTYAWI (H.) [Atypische Leberabszesse (Alia)].—*Neuigkeiten d. Tropische Medizin* I. 1929 Fd Vol. 2. No. 2. [In Georgian script. German summary pp. 181-182]

- HILLIET Quelques considérations médico-militaires sur la dysenterie amibienne.—*Ann de Méd et de Pharm Colon* 1928 Oct.-Nov.-Dec Vol. 26. No 4 pp 418-426
- PAPPALARDO (Concetto) Ricerche sulla trasmissione dell'amebiasi.—*Ann d'Igiene* 1929 Feb Vol. 30 No. 2. pp 123-129 [22 refs.] [Med Clinic, Univ Catania.]
- PEYTERAKIS (BL) La cholécystite amibienne calculeuse. Présence d'amibes dans le pus d'un cas de cholécystite calculeuse purulente.—*Rev Méd et Hyg Trop* 1929 Jan.-Feb Vol. 21 No. 1 pp 22-24 [5 refs.]
- ROSENBAUM (S.) Zur Differentialdiagnose der Säuglingsruhr Bemerkungen zur Arbeit von Leo BUCHHOLZ in dieser Zeitschrift Bd. 36 S.351 1927 — *Monatssch f Kinderheilk* 1928 Mar Vol. 38 No. 3 pp 213-214 [3 refs.] [Children's Clinic, Univ Leipzig]
- TÖRÖK (G) Zur Differentialdiagnose der Säuglingsruhr Bemerkungen zur Arbeit L. BUCHHOLZ und S. ROSENBAUM in dieser Zeitschrift Bd. 36 und Bd. 38.—*Monatssch f Kinderheilk* 1928. June Vol. 39 No. 3-4 pp 325-326
- ZSCHUCKE (Johannes) Las modernas investigaciones sobre la amebiasis humana y su importancia para la lucha contra esta enfermedad —*Medicina Países Cálidos* Madrid 1929 May Vol. 2 No. 3 pp 209-220

MALARIA.

LEAGUE OF NATIONS. Health Organisation. Report on the Work of the Malaria Commission at the Conference held in Geneva, June 25th-29th, 1928. C.H./Malaria/121 22 pp. 1928. Geneva.

This Conference discussed the following principles set out in the Second General Report of the Malaria Commission (see this *Bulletin*, Vol. 25, p. 115) —

(1) In Europe correct antimalaria practice is an endeavour to reduce the incidence and severity of the disease measures aiming at eradication are seldom justified.

(2) It is not always necessary to deal with malaria by a method arising directly out of the knowledge that the disease is transmitted by mosquito.

(3) In every place there must be a preliminary examination to ascertain the method best suited to it.

(4) It cannot be said that there is any one method of malaria control superior to all others.

Three Sub-Commissions were set up to facilitate the task of the conference. The first dealt with the methods suggested in the second general report for employment in antimalarial work the second considered *epidemiological aspects* the third discussed the use of quinine in treatment. Their reports were submitted to the plenary session and were adopted.

(a) The conclusions of the first Sub-Commission "express the agreement reached by malarialogists from the old and new world on the principles of dealing with malaria." They were as follows —

Each Government should establish a central permanent organisation, either independent or attached to an institute, composed of several selected workers who would devote their whole time to malaria research and would act as scientific advisers. The method of control must be adapted to the exigencies of the particular region where it is applied, and must be thoroughly tried before it is decided if it is efficient and suitable to the district. It should not be condemned because it is not immediately successful. The principal factor in the success of any method is the energy of the hygienists employing it. The Sub-Commission is not in favour of utilizing all available methods of control in the same locality at the same time. It considers it preferable to employ only the method or methods which, with the means available, can be brought above the standard called "minimum effective degree of perfection." This must be reached before its effect on incidence becomes appreciable. The description of antimalarial measures applied for a longer or shorter time in various countries, such as Italy and the U.S.A., attracts attention to the method applied and the results obtained, and there is a great temptation to imitate one or other of these models. Imitation in antimalarial work is dangerous. The Sub-Commission deprecates the use of measures in one region solely on the ground that they have been successful in another. Whatever other means may be employed in malarial localities the Sub-Commission considers that it is essential in the first place to treat the sick. The good results of early diagnosis and efficient treatment are more apparent in the reduction of the severity of the disease than in the reduction of its incidence. "Integral bonification," which may be regarded as the final object of all antimalarial measures requires a long period for its accomplishment. Extensive undertakings may provoke a temporary local increase in the amount of malaria. The improvement of the conditions of the inhabitants which results from the development of widespread "boul-

fication is one of the determining factors in the regression of malaria. The work done is only efficacious in-so-far as it leads to intensive cultivation of the ground. It is certain, however that the use of anti-larval measures, whilst more extensive works are being carried out, is of great value inasmuch as it reduces the anopheline density and serves to bridge the dangerous period which accompanies and follows such undertakings

(b) The second Sub-Commission which considered the epidemiology of malaria, were of opinion that in general, historical records of mortality statistics do not provide a good method of ascertaining the distribution and character of malaria, and the result of their use as an indicator of success in anti-malarial measures may be very misleading. The following subjects of research were suggested —

I. Studies relating to the Biology of Anopheles.

1 Pathogenicity of the various plasmodia to anopheles can an intense infection produce sterilization of the mosquitoes and modify the migration of these insects?

2. Domestic malaria and proofs of the permanent domesticity of anopheline carriers of malaria.

A. Domesticity of the various species of anopheles.

B Changes in adaptation of anopheles of a given species according to the varying conditions of their habitat.

C Means of estimating the degree of domesticity of a given species of anopheles

D Importance of peridomestic collections of water and their relationship to the habitat of adult anopheles

3 Study of certain facts influencing the biology of anopheles and their relationship to the efficacy of anti-larval measures

A. Degree of permanence of collections of water used as breeding places.

B Mechanical limitation of the migration of anopheles

(i) Length of flight.

(ii) Altitude

(iii) Wind and other meteorological factors

(iv) Forests, etc

C. Biological obstacles to the migrations of mosquitoes

(i) Inhabited houses.

(ii) Stables animal sheds etc.

4 Study of the various factors which cause anophelism without malaria, *i.e.*, which prevent the local anopheles from acting as malaria vectors

This enquiry should be carried out particularly in districts where the phenomenon occurs and which border upon areas where malaria is endemic. Efforts should be made to ascertain whether any of the factors claimed to be the cause of the phenomenon are operative in the country under observation and the investigation would be especially concerned with the following subjects

" (a) Differences in the anopheline density of the malarious and non malarious regions

(b) Morphological and biological differences of the anopheline population of these regions especially with regard to selection of food (animal or human blood) shelter (animal or human habitations) and breeding-places (hydro-telluric conditions)

(c) Differences in relation to receptivity of both anopheline faunas with regard to malarial infection.

- "(d) Differences in relation to the human host and its surroundings—
 (i) Numerical relationship of anophelines in contact with man and animals in stables, especially such animals as may be shown to be attractive to anophelines by means of the precipitin test.

- (ii) Conditions of housing, especially with regard to the shelter offered to anophelines.

"*Note* It is understood (1) that these factors are not necessarily the same in the various regions (2) that it is essential for the present not to take it for granted that an explanation obtaining in one region holds good in another however feasible it may be (3) that it is only after the determination of such factors in many localities that it will be possible to determine the fundamental cause of the phenomenon.

II. Studies relating to Malaria in Man.

1 Possibility of persistence of the capacity for evolution of gametes derived from an individual treated with quinine. This knowledge is necessary for an accurate estimation of the value of quinization in infections by the various species of plasmodia.

"2 Climatic and seasonal influences on schizogonic development of the various plasmodia.

"3 Study of haemoglobin in the course of malarial infection and during treatment.

"4 Determination of a method of distinguishing

- A. Primary infections.
- B. Re-infections
- C. Relapses

III Studies dealing with Anti Malaria Measures.

1 Factors in the so-called spontaneous regression of malaria

A. Value of the data on malaria contained in vital statistics.

"B Experimental study of the factors involved in complete remissions in the diminution of endemic malaria.

C Influence of ricefields.

D Influence of the cultivation of other irrigated crops.

2 Study of the various methods of destroying anophelines in dwellings without injuring the contents of the rooms.

3 The determination, in each country and region, of the domestic animal which attracts anophelines most and the correlation between this fact and malaria prevalence.

4 Is the development of zygotes inhibited by the absorption of animal blood by the infected anophelines during this development?

(c) The third Sub-Commission considered the use of quinine in malaria. They were of opinion that the dose employed for the treatment of the attack must depend on the form of the parasite the nature of the disease and the character of the epidemic. They recommended that treatment should be continued for four to six weeks after the cure of the acute attack by a daily dose of 1 gram of quinine with intervals of three or four days during the second half of the period. The Sub-Commission recommended that experiments should be continued with kinetum extracted from different varieties of bark, with the secondary alkaloids of cinchona, and with other substances, notably plasmoquin and quino-stovarol.

A plan for the international study of malaria was drawn up at the Conference and problems were allotted to malarialogists in different countries.

William Fletcher

ANDERSON (T F) *Some Investigations into the Incidence of Malaria in the Teita District.*—*Kenya & East African Med J* 1929 Apr Vol 6 No 1 pp 2-11 With 2 graphs in text

Dr Anderson examined a number of natives in the Taveta Dabaida and Sagalla native reserves in the Teita district. The Taveta reserve is a small, fertile area about ten miles long consisting largely of forest on the Tanganyika border of Kenya. More than 90 per cent of the children were found to have enlarged spleens and over 60 per cent had parasites in their blood. The common anopheline caught in houses was *A. funestus* (99 per cent) there were also a few *A. costalis*. It is considered that malaria is by far the most important factor in causing the high infant mortality and decreasing population. The Dabaida and Sagalla reserves are situated in hilly country. Malaria is endemic below 3 600 feet and the spleen rate is 30 per cent. At greater altitude it is uncommon and the spleen rate is only 0.2 per cent. *A. funestus* and *A. rhodesiensis* were present at all altitudes but *A. costalis* was found only in the most heavily infected areas.

W F

CAMPBELL (J McP) *Malaria in the Uasin Gishu and Trans Nzoia.*—*Kenya & East African Med J* 1929 May Vol. 6 No 2 pp 32-43 With 1 chart

Malaria is a grave menace to the development of these fertile districts in the highlands of Kenya.

The river Nzoia rises in the Charangani hills and flows westward through a fertile plateau nearly 3 000 square miles in extent situated on the Equator in the north west corner of Kenya, some 6 000 feet above sea level. The district north of the river is called Trans Nzoia, that to the south is the Uasin Gishu. The European population in 1928 was 2,500. Dr Campbell sketches the history of malaria in the plateau and suggests its causes and remedies. It is the usual story of malaria in a newly opened country: the first settlers went there in 1906 and for the first twenty years there was very little malaria, so little indeed that they did not even use mosquito nets. Yet there was always a little and now and then a case of blackwater. The disease was biding its time as Dr Campbell says and in 1926 the incidence and mortality of blackwater fever among Europeans had so greatly increased as to cause a slump in the price of land. The year 1928 was still worse: there was a very severe outbreak and few people in Eldoret or Kitale escaped. Dr Campbell considers that the disease is incidental to the early stages of development and that the outbreak of 1928 was largely due to lowered resistance and lack of proper food, following a seven months drought. He urges that all should take personal protective measures against infection and that settlers should endeavour to produce vegetables, fruit and milk for their own use in addition to commercial crops such as maize. He attaches great importance to the creation of a native farm labourer class resident on the farms and to the better housing and feeding of native labourers. In short he counsels the European settlers to live less carelessly and to pay more reasonable attention to their own health and to that of their labourers. He concludes that given the immigration of more settlers with capital, energy and a knowledge of farming to carry on and extend the work of the earlier pioneers there can be no doubt as to the eventual prosperity and attendant healthiness of the district.

W F

THOMSON (John Gordon) *Endemic and Epidemic Malaria in Southern Rhodesia*.—*Proc. Roy Soc Med* 1929 June. Vol. 22 No. 8. pp. 1051-1056 (Sect. Epidemiol. & State Med. pp. 49-54). With 9 charts in text [9 refs.]

Dr Thomson began his lecture with a brief account of Southern Rhodesia which he described as a plateau about twice the size of England, nearly a quarter of which is over 4 000 feet above sea level. Though it is situated within the tropical belt he considers that the climate in most areas is ideal for Europeans. The annual rainfall is from 21 to 37 inches almost all of it falls during the hot season, between October and March, when the mean maximum temperature is above 80 F and the mean minimum about 60 F. The population numbers about a million, some 50 000 of which are whites. The natives are allocated in Reserves but as labourers they come into contact with the whites. Malaria is hyper-endemic in many places and it is almost all of the subtertian type. It reaches its maximum each year during March, April and May and the amount is directly dependent on the rainfall. The worst malarious areas are the fertile river valleys, occupied by European settlers at an altitude of about 3 000 feet, and blackwater fever is common there. The native children in the hyper-endemic areas (i.e. spleen-rate over 50) are the chief infectors of anopheles. Up to the age of two years they suffer from acute infestation with enormous numbers of asexual parasites and many of them carry crescents. Dr Thomson found 40 per cent with crescents in single examinations of one hundred children. Those who survive gradually develop a tolerance when they reach adult age, they all harbour parasites in very small numbers ("immune infestation") but crescents are seldom found.

Dr Thomson examined 106 white children in three hyper-endemic areas where Europeans had settled, with the following results—All but two gave a history of malaria, 83 had enlarged spleens, and 9 had suffered from blackwater fever. He considers that "considerable carelessness in the choice of the site for their houses, and gross neglect of recognized anti-malarial measures are still displayed by many settlers in the rural areas. He found that the chief anopheline associated with malaria was *A. costalis*. It appears late in November and is killed off in June by the sudden fall in the temperature. This anopheles is stealthy in its habits, silent in its flight, and difficult to find. The inhabitants of unscreened, blackwater houses, as often as not will state that they seldom see mosquitoes and are not bitten. Dr Thomson hunted for mosquitoes in one of these houses without success, but by covering the bedroom window with netting before sundown he was able to capture on the inside of the net, a number of anopheles which had been hiding in the house during the day and tried to fly out at sunset. His observations led him to conclude that most of the malaria in Southern Rhodesia is contracted when the inhabitants are asleep in bed. The large towns such as Salisbury and Bulawayo are practically free from malaria, but in the widely scattered farms of the rural districts the problem is very difficult. Dr Thomson considers that "well-built and carefully screened houses and the rigid use of efficient mosquito nets undoubtedly constitute one of the best methods of protection in the rural districts." He concludes that there is little doubt that malaria and blackwater fever will become, in the process of civilization and the development of Southern Rhodesia, comparatively unimportant diseases.

BOSE (K) Proceedings of a Conference held at Birnagar (Bengal) on Sunday, the 24th February, 1929, at 2-30 p.m., to discuss the Problem of Malaria Control at Birnagar—*Indian Med Ga.* 1929 June Vol. 64 No 6 pp 323-328 With 3 text figs

This Report contains a most interesting observation. There is a number of lakes or tanks at Birnagar which are always stocked with edible fish. These tanks have been oiled because anopheline larvae breed in them untouched by the fish. The result has been most unfortunate. Mr Bose the Honorary Secretary of the Palli Mandali, writes the fish swallow up the oil, imbibe its smell, and retain it even when cooked for the table. The smaller varieties of fish cannot be eaten owing to the smell, while the larger varieties imbibe the smell in their heads which have to be rejected. It seems doubtful whether we are justified in causing serious injury to the fishing industry of the village. The Proceedings show that valuable anti malarial work is being carried on in Bengal by voluntary agencies. Anti-larval measures have not produced any tangible result in Birnagar but steps are being taken to determine the principal carrier and when this has been done efforts will be concentrated on the control of this species. The evidence so far points to *A. philippinensis* as the culprit.

W F

MADRAS KING INSTITUTE OF PREVENTIVE MEDICINE GUINDY Supplement to Ann. Rep for 1927-28 pp 2-22 With 4 figs. on 1 plate 2 maps & 2 charts—**Malaria Surveys of Mopad, Duttalur and Udayagiri in 1926 and 1927** [KING (H. H.) & others.]

The Mopad area in the Nellore district of Madras is a dry barren country because famine occurred a reservoir was built by damming the river and the land was irrigated from this source in 1921. Since then wet padi has been cultivated and when Assistant Surgeon K. V. KRISHNAM made a malaria survey he reported that the people seem to be fairly well off though they sell the rice they grow and eat millet. Malaria, chiefly subtertian was found to be very prevalent the principal carrier proved to be *A. culicifacies* seconded by *A. stephensi* and *A. lintoni*. The breeding places were pools in the old river bed below the dam, the irrigation canals and seepages from them. Col. King and his assistant attribute the prevalence of malaria to the raising of the subsoil water by the installation of irrigation without the provision of adequate drainage.

W F

STRICKLAND (C) assisted by CHOUDHURY (K. L.) in collaboration with others. **A Report on a Mosquito-Malaria Survey of the Duars Tea Gardens. Including a Note on the Anopheline Larvae found in Borrow-Pits by S. KINGSLEY WARD and Some Factors in the Epidemiology of Blackwater Fever in the Duars by Oliver McCutcheon**—pp iv+145 With 3 figs.

A large part of this Report is occupied with extracts from the publications of other workers and with a critical examination of the recommendations made by CHRISTOPHERS and BENTLEY in 1909 with reference to malaria in the Duars. Dr Strickland does not agree that the condition of squalor and neglect noted by these authors in the

crowded labour camps had anything to do with the excessive sickness from malaria or that the removal of these conditions (which he calls bonification) has been worth while. He states that the well-housed, highly-paid, and pampered planter and the bloated babu are as seriously affected as the labourer but he does not support this statement by figures showing the death-rates from malaria in these groups. He goes on to say that the coolies on many of the rubber estates in Malaya live in labour camps of a more exotic character than any the Duars coolies are ever forced to occupy and yet in certain wide tracts their consequential social and economic condition does not lead to the slightest amount of malaria." This statement is incorrect if it is meant to imply that the coolies on many of the rubber estates are living in squalor and neglect but free from malaria. Dr Strickland states that the appearance of the coolies in the tea-gardens of the Duars to-day reflects their general contentment and prosperity but that the spleen index is as high as it was when CHRISTOPHERS and BENTLEY made their survey twenty years ago. Surely it has been worth while to improve the conditions of labour if it has made the coolies contented and prosperous and anxious to remain in the country.

A. maculatus was found in the highest zone of the tea-gardens, under the foothills of the Himalaya where the fluctuation in the amount of surface water was most considerable. *A. furcatus* was found in the perennial streams of the lowest zone nearest the plains. *A. californicus* in the intermediate zone breeding in the pools left in the river-bed when they dried up after the rains and also in the streams which form at the beginning of the rains. These three mosquitoes were considered the principal carriers, but lack of staff prevented a search for zygotes and sporozoites. Dr Strickland adds, "we think it possible that *Anopheles* may be present and conclude that as it is a carrier the jungle is a danger."

The spleen-rate on some tea estates was much higher than on others it was difficult to find a reason for this and in attempting to explain a spleen-rate of 86 on one block of estates, and one of only 47 on another Dr Strickland attributes the difference to an error due to the small numbers examined.

Among the recommendations made at the end of the Report there are two which are unlikely to meet with general approval the first is that gumme tannate might be used with advantage for dosing everybody with the object of sterilising the reservoirs of the parasite so that the mosquito cannot become infected. The second is under the head of "Measures of protection to the individual from the bite of the infected mosquito" and is to the effect that there is no reason why coolies should not be salted artificially as are Queensland bulls with *Protoplasma bovis*.

W F

HINDLE (Edward) assisted by CHOW (Feng Lan) Experiments with Malaria and Mosquitoes in Shantung, China with a Note on the Value of Local Species of Fish for the Destruction of Mosquito Larvae.—*Trans. Roy Soc Trop Med & Hyg* 1929 June 25. Vol 23 No 1 pp 71-80 [28 refs.]

These experiments were made at Tsinan, in the Province of Shantung. Endemic malaria is not at all common, in spite of marshy land and numerous springs around the lake within the walls of the city. Is

September some waters swarm with the larvae of mosquitoes but others are entirely free this Dr Hindle attributes to the presence of small fish which devour them. Only two species of anopheles have been found in Tsinan they are *A. hyrcanus* var *sinensis* and *A. Pattoni*. In order to determine their importance as carriers of malaria, laboratory-bred mosquitoes of these species were fed on a case of benign tertian malaria in the hospital of the Shantung Christian University. Only twenty out of 121 *A. hyrcanus* became infected or about 16.5 per cent in contrast to this nine out of eleven *A. Pattoni* or 82 per cent were infected by feeding on the same patient. The authors conclude, as the result of these experiments and because *A. hyrcanus* (though the most common local anopheline) is rarely seen inside any building that *A. Pattoni* is the most important agent in the spread of malaria in North China.

The almost universal absence of mosquito larvae from streams inhabited by small fishes led the author to make experiments to determine which were the most efficient destroyers of larvae. For this purpose single fish were placed in glass jars and numbers of culex larvae were introduced from time to time. All the seven species which were tested, devoured the larvae readily but two species *Pseudogobio sinensis* and *Eleotris swinhonis* were the most efficient

W F

WALCH (E. W.) & SOESILO (R.) Annotations from Everywhere about Malaria in the Netherlands Indian Archipelago L.—*Meded. Dienst d. Volkgezondheid in Nederl. Indië* 1929 Vol 18 No 1 pp 199-207 With 3 plates. [6 refs.] [Med Lab Weltevreden.]

This paper records the finding of *A. ludlowi* for the first time in Dutch Borneo. With regard to the morphological character of the wings the Borneo species appears to occupy a position intermediate between the *ludlowi* of the Philippines to the north and the *variatio sumatana* of the Soenda Islands to the south. The authors state that formerly the presence of *A. ludlowi* in the Dutch Archipelago has meant the prevalence of serious malaria but on the north-east coast of Atjeh they were surprised to find that *A. ludlowi* occurs in great quantities without the population suffering badly from malaria. and they suggest that it may be more zoophilous here than elsewhere.

They find that *A. sinensis* is the chief carrier in the interior of southern Sumatra. Large numbers were detected and infected specimens were discovered. It was found breeding in rice-swamps and other stagnant overgrown fresh water collections.

A. maculatus the most dangerous carrier in the Federated Malay States occurs in the Dutch Indies but it is of little importance there, and no infected specimens had been found until April, 1928 when the authors found 4 containing zygotes among 135 taken among the terraced rice-fields (there is running water in terraced rice-fields) at Batoen, in Java, 3 000 to 4 000 feet above sea level. *A. aconitus* also was found breeding there. The authors also discovered *A. fuliginosus* for the first time in Borneo and confirmed the occurrence of its larvae in brackish water. Infected 4 *umbrosus* were caught on the island of Banka, in the neighbourhood of the tin mines.

W F

ESSED (W. F. R.) *Malaria at Banjoewangi and the Prospects of an Efficient Species Sanitation.*—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1929 Vol. 18. No. 1 pp. 184-198. With 2 maps & 1 fig. on 3 plates. [3 refs.]

Banjoewangi is on the east coast of Java at the mouth of a river very little above the level of the sea. The dangerous carrier *A. ludlowi* does not breed in the lagoon which the tide keeps free from algae, but the natives have surreptitiously constructed large numbers of fish ponds by throwing up embankments which keep out the tide. Floating algae cover these ponds and *A. ludlowi* breed in enormous numbers. Dr. Essed is confident that malaria can be greatly reduced at a small cost by destroying the embankments, the other species of anophelines in the district being comparatively unimportant.

W. F.

SCHUURMAN (C. J.) & HUIDINK (A. Schuurman-ten Bokkef). *Malaria Problem on Java's South-Coast.*—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1929 Vol. 18. No. 1 pp. 127-142. With 1 folding plan & 5 figs. on 3 plates. [1 ref.]

A certain Company with a large concession of land, has found it very difficult to obtain labour owing to malaria. Their estate is on the borders of a great swamp through which runs a river blocked at its mouth by a wall of stones and sand thrown up by the sea. The Company, thinking that their troubles are due to the swamp, have offered to drain it if the Government will give them a long lease of it, for the ground will be very fertile. The Government thinks of draining it themselves, because more than 1 000 acres of rice could be planted there by the natives. The authors were requested to make a survey in order to determine if the swamp was the cause of the epidemics of malaria in the district. This they did, and found that no dangerous mosquitoes were breeding in the swamp itself. *A. aconitus* the principal carrier was breeding in the small running streams that fed the river. *A. ludlowi* was breeding near the mouth of the river near the sea, where it was blocked and full of algae. Various remedies are discussed by the authors but whether they are practicable or not depends on how much money the Company or the Government is prepared to spend.

W. F.

SOEKILO (R.) *Litireksel uit het rapport omtrent het onderzoek naar de verspreiding van de malaria op het eiland Nias.*—*Geneesk. Tijdschr. v. Nederl. Indië* 1929 Apr. 10 Vol. 68 No. 4 pp. 350-368. With 2 folding maps. [Med. Lab., Weltevreden.]

— *Abstract from a Report about the Spreading of Malaria on the Island Nias.*—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1929 Vol. 18 No. 1 pp. 85-110. With 2 folding maps [Med. Lab. Weltevreden.]

The island of Nias on the west coast of Sumatra is hilly, except for the east and south-east where there is a rather extensive swampy coastal plain. Here malaria causes a high spleen-rate 98 per cent. among children, 92 per cent. among adults. The parasite-rate in both groups is 48 per cent. and 18 per cent. the crescent-rate 21 per cent and 4 per cent. In the hills the spleen-rate (31 per cent.

and 40 per cent.) and parasite-rate (14 per cent and 7 per cent) are much lower and simple tertian (50 per cent) predominates, whereas subtertian (71 per cent) prevails in the plains.

A. ludlowi Theob is the principal carrier in the plains 10 out of 301 were found infected. Of the other Anophelines examined in sufficient numbers *A. punctulatus* Dö var *testellatus* Theob was found infected once (out of 197) none of 230 *A. Kochi* Dö harboured parasites. Larvae of *A. ludlowi* were collected in the coastal swamps which were cleared for cultivation (badly kept rice-fields) no breeding occurred in the uncleared shade swamps. The larvae were not confined to brackish water but were found also and in great numbers in an impounded freshwater lake in the hills in the vicinity of the coastal plains.

The hill malaria is probably transmitted by *A. maculatus* Theob which was found in 505 out of 679 breeding places examined there.

Other Anopheline species besides those mentioned are *A. barbrostris* v.d.W. *A. hyrcanus* Pall. *A. umbrosus* Theob *A. atkensii* James *A. leucosphyrus* Dö

N. H. Swellengrebel.

OTTOLENGHI (D) in collaboration with BONALBERTI (E) & BRIGHENTI (D) Le condizioni della malaria e la lotta antimalarica nelle bonifiche ferraresi (Relazioni per gli anni 1927-28) (Malaria Conditions and Malarial Control in Ferrara Province after the Agrarian Sanitation Works).—*Riv di Malarologia* 1929 Mar-Apr Vol 8 No 2 pp 113-148 With 2 figs [17 refs] [English summary p 235]

Malaria in three zones is discussed Diamantina, Jolanda di Savoia, and Gorino *A. maculipennis* was present throughout the whole period but *A. algeriensis* and *A. bifurcatus* were scarce in proportion at any time and disappeared in April and May respectively Anopheles were found in the houses.

In Jolanda the incidence of malaria fell from 2.5 in 1927 to 0.9 per cent in 1928 in Diamantina from 38.2 to 24.4 per cent. and in Gorino from 46.6 to 25.3 per cent. In the first named bonification was much more thoroughly carried out water supplies and accumulations were attended to cattle-stalls regulated dwellings made lighter and more sanitary mosquito destruction more energetically pursued and sanitation generally improved.

The extent of flight and migration of mosquitoes were estimated. The longest flight was 7 kilometres.

Both at Jolanda and Diamantina mosquitoes recaptured in the flight experiments were found to have fed on bovines rather than on man. In one only of 130 examined by precipitation tests did the blood prove to be human.

Some specimens of *A. maculipennis* were appreciably larger than others this is ascribed to difference of nutrition in the larval stage. In Jolanda the anopheles were of small size, at Gorino larger though of the same species. Both appeared to be equally capable as vectors but it was noted that at Jolanda malaria was very slight. The preference of anopheles for dull and dark colours was confirmed. Of 513 *A. maculipennis* used in experiment 20 per cent. were found on blue 18 on dark red, 16 on reddish brown only 0.8 per cent on pale green 0.4 on ochre or white and none on yellow.

The second part of the article deals with anti-malarial measures, particularly the treatment of retting ponds with Paris green, and bonification, partial or integral. Even partial led to the reduction of endemicity and of the splenic index.

In the summary it is stated that paludism rapidly disappears from land under cultivation if water and irrigation are properly attended to and supervised. The presence of cattle in warm stalls is an additional safeguard to man. Paris green is good, but proper bonification is better.

H. Harold Scott.

Rossi (Giacomo) Tre anni di lotta antimalarica a Maccarese durante l'effettuazione della Bonifica integrale." (Three Years' Anti-malarial Campaign at Maccarese during the Execution of the Integral Bonification ("bonifica integrale"))—*Rev di Malariologia* 1929 Jan-Feb Vol. 8. No. 1 pp 1-27 With 5 text figs & 8 figs. on 4 plates. [10 refs.] [English summary p 108.]

An area of some 12,000 acres on the right of the Fiumicino Canal, in the Tiber delta which was uncultivated and almost uninhabitable up to 1925 on account of malaria, is now being reclaimed by the Società Anonima Maccarese. An intensive anti-malaria campaign, directed by the author and conducted by a separate organization, is closely associated with the work of reclamation which includes hydraulic, agricultural, and building work. All means of control are employed, including propaganda and anti-malaria regulations. In three years the inhabitants have increased from 50 to 1,800 in addition to another 1,000 day labourers. It is claimed that there is no better example of such a complete and rapid "integral bonification" either in Central or Southern Italy.

W F

Ross (Ronald) Malaria Control through Anti-Mosquito Measures in Italy [Correspondence]—*Trans Roy Soc Trop Med & Hyg* 1929 June 25 Vol. 23 No. 1 pp 107-108. [1 ref.]

In the discussion which followed a paper read by Dr L. W. HACKETT, on February 21st 1929 before the Royal Society of Tropical Medicine and Hygiene Col S. P. JAMES stated that the first practical tests of Sir Ronald Ross's method of combating malaria, which were made at Freetown and Mian Mir early in the present century "showed that, at any rate in those two localities, anopheles reduction was difficult and expensive. It could not be accomplished in those localities by the new method which Major Ross had proposed. The blow to practical anti-malarial work was a hard one." Col. JAMES also spoke of the discovery of plasmodium and Paris green as advances towards the solution of the malaria problem. Sir Ronald Ross, in a letter to the Editor of the Transactions of the above Society disagrees with Col. JAMES's conclusions. He points out that the work at Freetown was undertaken by Dr Logan TAYLOR and himself as an object lesson. It was reported on favourably as far as it went, and was discontinued owing to opposition, lack of funds, and because the necessary object lesson was supplied by the work of GORGAS in Havana. "There was no blow to practical anti-malarial work in this expedition of ours."

The experiment at Mian Mir Sir Ronald considers to have been futile and proving nothing. With reference to Paris green he points out that the cost of the actual larvicide is small when compared with the cost of administration and labour and that it may not cost as much to distribute paraffin as to distribute Paris green. He considers that before plasmoquin can be looked upon as a sound substitute for quinine it must be shown to be not only equal in value to quinine but its superior.

W F

DE BUCK (A) SCHOUTE (E) & SWELLENGREBEL (N H) Studien ueber Anophelismus ohne Malaria in der Umgebung Amsterdams. [*Anophelism sine Malaria in the Neighbourhood of Amsterdam.*]—*Cent f Bakt I Abt Orig* 1928 Nov 7 Vol. 109 No 5/6, pp 251-284. With 5 maps 6 graphs & 3 figs. on 1 plate [Refs in footnotes.]

The problem attacked in this memoir is the following. A number of districts in the neighbourhood of Amsterdam all harbour anopheline mosquitoes in some of these districts malaria is more or less frequent in others it does not occur. Can the distribution of malaria be explained by (1) biological differences of the insect porters (2) variations of mere numbers (3) varying access to human beings? The authors on the basis of large samples of material analysed by biometric methods are able to establish the existence of two forms of *A. maculipennis* characterized by morphological and biological differences. A small winged form, which does not hibernate, is specially characteristic of the malarious regions and the authors hold this to be an important factor of differentiation but not the sole factor for the small form does also occur in malaria free regions. Ancillary factors are variations of gross population and of frequency of alternative hosts e.g. presence or absence of large numbers of swine.

[The paper contains much numerical material and is of biometric importance. From the statistical point of view it would have been improved had a fuller description of the method of analysis been given. It is for instance not clear how the correlation between wing length and presence of a highly developed fat body has been calculated.]

M. Greenwood.

VERSLAGEN EN MEDEDEELINGEN BETREFFENDE DE VOLKSGEZONDHEID 1929 May 33 pp With 1 diagram [7 refs.]—Jaarverslag over de jaren 1927 en 1928 van de malaria-Commissie uit den Gezondheidsraad. [Report of the Malaria Commission of the General Sanitary Council, Netherlands, on the Years 1927 and 1928.]

This biennial report is the direct continuation of the annual reports of the Malaria Commission in the province of North-Holland for the years 1920-1928. This commission by being incorporated in the general sanitary council, has exchanged its independence for the right to extend its activity over the whole of the kingdom.

The records on the incidence of malaria, based on the exact observations in the selected stations, have continued without interruption. A diagram shows the rise and decline of two successive epidemics (1900-1903 and 1918-1922). In both cases the return to normal conditions has been effected without any special sanitary intervention.

This point is stressed as a reminder to the sanitarians (whose anti-larval work in Medemblik, N. Holland, in 1927 and 1928, carried out under the auspices and with the financial support of the International Health Division of the Rockefeller Foundation, is described in this paper from unpublished reports) not to be too sure that the reduction of malaria is due to their efforts, because such reduction has been general and not limited to the areas which they have taken in hand.

Several pages are spent in discussing an opinion emitted by C. SCHILLING (based on observations collected by KOKTEWEG) to the effect that new malaria epidemics are preceded by an unusually developed tendency of the pre-existing cases to relapse. It is shown that the returns in North Holland do not support this theory when the relapses occurring during the year of the primary attack are taken separately. The statement, made in 1922 that little malaria in the autumn means little malaria in the following year has been confirmed by additional observations.

Another aspect of the same problem, the prediction of the next epidemic, by changes occurring in the density of the anopheline population, requires the unfailing care of the commission. Regular counts in various resting places of anophelines in the neighbourhood of Amsterdam have been made since 1920 and are gradually being extended to other parts of the province. But will the commission succeed in inducing the sanitary authorities to keep their interest in malaria awake till the rise of the next epidemic, which can hardly be expected before 1938? This is doubtful considering the comparatively heavy expenses incurred.

Short accounts of investigations concerning the influence of land reclamation on the anopheline population and an inquiry into the phenomenon of anophellism without malaria in the Netherlands, occupy the remainder of this report, which beside much which is of local interest only touches upon certain points which command a wider attention.

N. H. Swellengrebel

SCHILLING (Clara) Zur Epidemiologie der Malaria. (Nachtrag zu der Abhandlung gleichen Titels in Bd. 110 S.120) [*Epidemiology of Malaria* Supplement to Previous Paper in Vol. 110, p. 120.]—*Ztschr f Hyg u. Infektionskr* 1929 July 24 Vol. 110. No. 2. pp. 427-428. With 1 text fig. [Robert Koch Inst. Berlin.]

A curve is given showing the total fresh infections from malaria in Wormerveer Holland, from 1903-1918. In 1904 the fresh infections showed a marked tendency to relapse. In 1905 the number of fresh infections increased considerably. In 1906-1908 the fresh infections showed a slight tendency to relapse or expressed otherwise, the action of quinine on the fresh infections was better. In the two following years the curve of fresh infections fell steeply. In 1916 there was a definite increase of the relapse cases, indicating a strong quinine resistance. Unfortunately owing to the departure of the Medical Officer the number of relapses and fresh infections for years 1917 and 1918 could not be ascertained. It is considered that the observations support the belief that the tendency to relapse, or resistance to quinine, plays a part in the production of malaria epidemics. Further observations on these lines are required. From the details at his disposal, the author is not

able to find support for his view that a relative increase of the percentage of relapses in a given year enables a conclusion to be drawn as to the malarial morbidity in the following year. He thinks that a thorough investigation of this very important practical point would be profitable.

E. D W Greig

GUFLMINO (D) Beitrag zur Epidemiologie der Malaria in Mazedonien. [Epidemiology of Malaria in Macedonia.]—*Arch f Schiffs u Trop Hyg* 1929 Aug Vol. 33 No 8 pp 423-430 With 2 text figs.

In Macedonia there is a certain degree of parallelism between the activity of anopheles and the variations in benign tertian malaria. The question arose whether this connexion was accidental or cause and effect. The investigation was undertaken to settle this point and at the same time to throw light on the occurrence of fresh infections and relapses in the various periods of the year. Malaria in Macedonia has a seasonal character. It begins with the appearance of new anopheles and ends with the cessation of their activity. The charts show that the curve of malaria begins to rise in the month of April falls slightly in June and again rises reaching its peak in September. It falls steeply in October and reaches its starting point in the following months. The off-season of benign tertian malaria lasts from November to April and during this period the mosquitoes hibernate. Winter infection is extremely rare. The mosquitoes are *Anopheles maculipennis* and *superpictus*. The conditions in the warm spring months in Macedonia are extremely favourable for the development of *P. vivax* in the mosquito. The spring epidemic of benign tertian malaria is mainly due to fresh infections not to relapses of old cases as some hold. The course of malaria is dependent on the biology of the anopheles. Although the anopheles diminish towards the end of May those that remain are much more heavily infected as the sexual forms of the parasites have become much more numerous in the blood of patients. This explains the rise of the malarial curve in July. In August and September new generations of *superpictus* arise and in these months the maximum of anophelism is reached, so the curve continues to rise. In October *maculipennis* and *superpictus* begin to hibernate. Malignant tertian malaria begins in epidemic form towards the end of summer (July) and lasts till the end of October. This summer autumn epidemic is chiefly due to fresh infections and the cause of the late appearance is the unfavourable temperature conditions for the mosquito infection with *P. falciparum*. It is considered that both *maculipennis* and *superpictus* take part in the transmission of *Plasmodium falciparum* in Macedonia.

E. D W Greig

PITALUGA MARTINEZ CERA, TORRIJOS & GINÉS. Estudios sobre el paludismo en Aragón. Estudio de la estanca de Alcañiz. [Malaria Research in Aragón. A Study of the Estanca de Alcañiz.]—*Medicina Países Calidos* Madrid. 1929 May Vol. 2. No 3 pp 225-250 With 19 text figs. French summary p 249

Under the direction of Professor Pittaluga, Dr Cera, Dr Torrijos and Dr Ginés have studied the conditions of endemic malaria and

anophelism in the neighbourhood of Estancia de Alcalá, a natural lake 6 kilometres in circumference. It is 8 metres deep in the middle and shallow at the edge covered with weeds and full of the larvae of *A. maculipennis*. In spite of this there is very little malaria among the inhabitants of the houses near the lake, and this study which will be continued throughout 1929 was undertaken to determine the reason for the low rate of infection. A detailed examination of domestic animals was made with reference to the number of anophelines caught in the houses.

The summary gives no information about the conclusions reached

W F

METZEL (P P) Beobachtungen ueber die tropische Malaria in der Stadt Woronezh (1924-1928) [*Malaria in Woronezh Town, Russia, 1924-1928*. — *Arch f Schiffs u Trop. Hyg* 1929. Jah. Vol 33 No. 7 pp. 383-397 5 refs.]

Observations were made at two malarial stations in the town of Voronezh, which is situated in Soviet Russia in Europe, towards the south-east. It is the capital of a Government of that name. The material was abundant. From April 1st, 1924 to April 1st, 1928, there were 18,407 first visits and 138,021 subsequent visits to the malarial stations. There were 2,120 cases of malignant tertian malaria. It occurred at all ages. The peak of malignant tertian malaria was reached in 1926 when there were 786 cases. In 1927 it fell to 398, and, in the first three months of 1928, there were only 13 cases. This marked fall is attributed chiefly to peculiar meteorological conditions of the last two years. Most cases relapsed. 474 34 per cent of malignant tertian cases were mixed infections. In 136 28 per cent *Plasmodium m* and *P falciparum* were found simultaneously. Much more frequently, however 713 per cent, *P vivax* was found before or after *P falciparum*. Malignant tertian malaria shows two peaks in the year a slight one in the beginning of the year and a marked one in autumn August and September primary infections occurring in August and relapses in September. The results are set forth in 5 tables.

E. D. W. Greig.

BOGOYAVLENSKY (N A) Endemic Malaria and Physical Conditions of the Population. — *Russian Jl Trop Med* 1928. Vol 8 No 10 pp. 639-643. [In Russian.] [From abstract furnished by Dr N A. Bogoyavlensky]

In the low-lying riverine part of Azerbaijan the spleen index is 87 and Ross's 5.3 in the mountains 17.1 and 1.6, and in intermediate irrigated parts 81.1 and 7.8. The mountain zone furnishes 3½ times as many acceptable recruits as the riverine. 8.7 per cent. of those from the first and 75.4 from the second require rejection.

Clayton Lane.

SOUTHERN MEDICAL JOURNAL. 1929 Apr Vol 22 No 4 pp 357-411 With 6 maps 1 chart & 1 graph [36 refs]—Symposium on Malaria. [UNDERWOOD (Felix J) KRAUSS (William) MURPHEY (E. E.) HACKETT (L. W.) HOFFMANN (Frederick L.) LEPRINCE (J. A.) & JOHNSON (H. A.) GRIFFITHS (T. H. D.) CARLEY (Paul S.) & BALFOUR (Marshall C.) VEELEY (Henry E.) BISHOP (Eugene L.) & ROBERTS (Frank L.) FULLERTON (H. R.) CLARKSON (L. M.) GILL (D. G.) KJEER (C. C.) & SIMS (L. C.) BAIR (M. Z.) FILBY (E. L.) ABERCROMBIE (T. F.) McCORMACK (A. T.) DOWLING (Oscar) PETTY (W. S.) LAUGHINGHOUSE (Chas O H.) HAMILTON (R. G.) GRANT (H. G.)]

The summer of 1926 saw the end of a steady and long continued decrease in the malaria-rate of the Southern States. There was a large increase in 1928 the type of malaria became more severe and several cases of blackwater fever occurred. At the 22nd Annual Meeting of the Southern Medical Association held at Asheville North Carolina, in November 1928 a meeting was held conjointly with the National Malaria Committee at which a number of papers was read dealing with problems in malaria.

(1) The Chairman Dr F. J. Underwood urged that every effort should be made to establish a full time County Health Department in each county of every State in the Union and that under this Department should come the handling of every health problem including malaria.

(2) Dr Wm Krauss Professor of Tropical Medicine in the University of Tennessee read a paper on the subject of plasmoquin. He found that 0.1 gram given daily in five separate doses was an excessive amount to use in general practice. He emphasized the efficacy of plasmoquin in benign tertian malaria and crescent cases but stated that it cannot and must not be relied upon in aestivo-autumnal malaria. Persistence in experimenting with plasmoquin in aestivo-autumnal malaria he said will result in serious disappointment and possibly some deaths from pernicious malaria. If crescents are present it should be given in conjunction with quinine.

(3) Dr E. E. Murphey of Georgia University recommended intravenous injections of sodium cacodylate in the treatment of malarial coma and other very severe forms of the disease. The drug was obtained in sterile ampoules and a total of 20 to 30 grains was given in four doses within each 24 hours. As soon as possible the arsenic was discontinued and quinine was given. In a series of experimental cases in which the drug was continued and no quinine was given the parasites disappeared and the patients were cured. In the discussion which followed Dr Murphey's paper Dr Krauss stated that he still held with other malaria workers that the arsenicals including sodium cacodylate were vastly inferior to quinine and that he did not feel that it would be safe to employ the large doses used by Dr Murphey.

(4) Dr L. W. Hackett of the Rockefeller Foundation in a most interesting paper on the habits of Anophelines which transmit malaria in America, in Europe and in the Far East pointed out the danger of drawing general conclusions from experience of malaria control gained in limited areas and the many failures which have followed attempts to apply methods which have been successful in one place, to the control of malaria in another area without first studying the local mosquitoes and their habits. He gave the following examples of the

differences in the habits of mosquitoes in different places and their bearing on methods of control. In the Malay States, for instance, *A. umbrosus* the carrier in the flat coastal plains, is a shade-loving mosquito and clearing the jungle banishes malaria. Farther inland, the carrier is *A. maculatus* which breeds in unshaded running water, and here clearing the jungle brings malaria. Again, in the Philippines, on the basis of experience in America, barracks for the American troops were built in the hills away from the coastal plains and swamps. Subsequent experience showed that this hilly country was the most malarious part of the Island, because *A. sinensis* the local carrier, breeds only in the hill streams and nowhere in the plains.

Malaria has disappeared spontaneously from some parts of Europe, and the theory has been advanced that it vanishes in the presence of intensive cultivation and improved standards of living. Dr HACKETT said that this generalization cannot be applied to the tropics: spontaneous disappearance of malaria is never seen there and "anophelines without malaria" is linked up with the food habits of the European anopheline *A. maculipennis* which in certain regions no longer bites man. He drew attention to the importance which some malarialogists attach to the killing of mosquitoes in houses on the ground that infected mosquitoes remain in the houses where they have fed. This theory he said, is not of general application: even if it may be true in some places it does not apply in the Far East where *A. culicifacies* the Ceylon carrier, *A. maculatus* the Malayan carrier and *A. sinensis* the Philippine carrier leave the houses as soon as they have fed.

Dr Hackett drew attention to the question why some species of anophelines are carriers and others are not and to the yet more puzzling question why a given species is a carrier in one place and not in another. For instance WIVORO found *A. aconitus* infected in Western Java, to the extent of 7 per cent, while SWELLENGREUTJ in the same year found none infected in Sumatra. *A. ludlowi* is another mosquito which carries malaria in one region and is harmless in another. In the mangrove swamps of Batavia and Singapore, it is a dangerous carrier: in the fish ponds of Manila, it is perfectly harmless. Dr Hackett believes that these differences are explained by the different habits of the anophelines in different places: in one they are man-eaters in another they are not. Thus, with regard to *A. maculipennis* on the Tiber delta, one mosquito in four was caught in bedrooms but in Massarosa (Tuscany) where malaria is very uncommon the anophelines were plentiful, but only one in 400 had bitten man as shown by the precipitin reaction of the ingested blood.

(5) Messrs J. A. LePrince and H. A. Johnson, Sanitary Engineers, of the U. S. Public Health Service described a method of distributing Paris green from a small skiff, fitted with an out board motor by means of a blowing equipment consisting of a 600 watt petrol engine-generator unit and a 100 watt electric-driven blower. This apparatus distributed 5 to 15 per cent. Paris green, mixed with hydrated lime as the boat moved along. The time of application was five minutes an acre, and half a pound of Paris green per acre was found sufficient. They drew attention to the numerous unsatisfactory and inert samples of Paris green which are on the market.

(6) Dr Gill of the Alabama State Board of Health stated that each lot of Paris green should be examined to ascertain if it contained the required minimum of 50 per cent of arsenious oxide and that its toxicity for larvae should be tested both in the pan and in an experi-

mental area. He also recommended that it should be fine enough to pass through a 300-mesh sieve. He had not found Paris green equally effective on all breeding grounds, it worked best where weeds were present. He had found kaolin, soapstone and lime equally suitable as diluents.

(7) Drs. H. E. Meleney, E. L. Bishop and F. L. Roberts read a paper on the malaria problem of the 453 square miles of Tennessee which are subject to flooding by the Mississippi the entire area of which is suitable for the breeding of *A. quadrimaculatus*. They considered most of the breeding grounds too extensive and inaccessible for the use of larvicides. Air plane dusting with Paris green is of course far too expensive for use over this large area and the authors consider that country wide screening may bring a greater amount of immediate relief than any other anti malarial measure. Detailed estimates of the cost of screen doors and screen windows were given by Mr. H. R. Fullerton.

W F

BARBER (M. A.) KOMP (W. H. W.) & KING (C. H.) *Malaria and the Malaria Danger in Certain Irrigated Regions of Southwestern United States.*—*Public Health Rep.* 1929 May 31 Vol. 44 No. 22. pp 1300-1315 [3 refs.]

Many thousands of acres have been reclaimed by irrigation in the arid regions of the South-Western United States. The climate is warm and the water brought in by irrigation often becomes highly productive of anopheline mosquitoes. The authors did most of their work in the Rio Grande valley of New Mexico and Texas the Pecos Valley of New Mexico the Salt River Valley of Arizona and the Imperial Valley of California. In the localities surveyed, malaria seems to be largely confined to the Rio Grande Valley of Texas and New Mexico. *A. pseudopunctipennis* was found in both localities and *A. maculipennis* was present in addition in New Mexico. The prevailing type of malaria is benign tertian. The authors recognise that it is neither necessary nor practicable to carry out expensive anti-mosquito operations throughout the Rio Grande Valley but as malaria has become a serious problem in at least one locality where it was not known before 1905 they recommend the following measures early recognition and treatment of cases education anti larval measures in populous centres where the malaria rate is high. They have found Paris green and Gambusia most useful in these regions.

W F

HILL (Rolla B.) *El paludismo en Venezuela.* [Paludism in Venezuela.]—*Gac Med de Caracas* 1928 Dec 15 Vol. 35 No. 23 pp 353-359 [3 refs.]

Investigations have been made by the Health Department of Venezuela with the aid of the Rockefeller Foundation into (1) malarial prevalence in Venezuela (2) hookworm (3) the malarial problem in Maracay. The first only is dealt with in the present article. In some parts, Mérida Trujillo Falcón and Nueva Esparta, mortality from malaria is very low but in Anzoátegui Carabobo Portuguesa, Cojedes

and Zamora very high. Blood was examined from 1,941 individuals and spleen measurements in 3,515. Of the bloods examined 488 (16.5 per cent.) contained parasites: 330 *P. vivax*, 123 *P. falciparum*, 19 *P. malariae* and 16 mixed. In Los Llanos 38 per cent. of the bloods were positive and the splenic index for the whole region 69 per cent. Palenque was the most infected district the figures being 70 per cent. of blood infections and 99 per cent. with splenic enlargement.

Sixteen or seventeen species of Anopheles have been identified in Yucateca, of which *A. albimanus* is the chief, some maintain the sole transmitter of malaria.*

H. Harold Scott.

WILSON (P. W.) Report of Malaria and Microfilaria Survey of 11,000 Laborers and 2,007 Children in Haiti.—*U.S. War Med. Bull.* 1929 Jan. Vol. 27 No. 1 pp. 87-93

11,000 men desiring to ship from Port de Paix, Haiti, for the Cuban cane fields were medically examined generally and also specially for enlarged spleen, haemoglobin, plasmodia and microfilariae. Every man was photographed, vaccinated, given 1 cc. of oil of chenopodium from which only one man suffered ill effects—he had walked for two days almost starving and recovered as the routine purge of 80 cc. of a saturated solution of magnesium sulphate began to work. Quinine was given to all with malaria parasites. In seven cases plasmoquin compound was given in daily dose of 0.04 gm. plasmoquin and 0.6 gm. quinine. In one of the seven after 6 days treatment, there appeared gastric pain, dizziness, vomiting, pallor, jaundice, basophilia, and leucocytosis of 20,000 to 25,000. He recovered.

C. L.

ALIGLER (I. J.) & REITLER (R.) Studies in Malaria. IV.—Prophylactic Use of Plasmoquin in a Bedouin Population.—*Rev. de Malariologie* 1929 Jan.-Feb. Vol. 8, No. 1 pp. 23-33 [Malaria Research Station, Hebrew Univ. Jerusalem, Palestine]

The authors' purpose was to administer plasmoquin compound, daily for one week, to a group of highly infected Bedouins who live on the outskirts of the Jewish colony established at Hedera. They intended to repeat the treatment whenever fresh gametocytes appeared, until they had determined the minimum period of treatment which would give the maximum period of freedom. This procedure was to be carried out during the active anopheline season and its effect on the course of malaria in the untreated Hedera population was to be noted.

In connexion with this work of Dr. Rolla Hall attention should be called to the summary of a paper by Dr. BENARROCH on Studies on Malaria in Yucateca (*ante*, p. 368). In this a list is given of 16 species of Anopheles captured, of which ten were so scarce as to warrant exclusion as vectors of the disease. The remaining six (which were named in the abstract) were not naturally infected as was erroneously stated, but were regarded as "probable vectors." Natural infection was exceedingly rare. None was found among 741 mosquitoes dissected by Dr. BENARROCH in 1927 but in the following year two specimens of *A. albimanus* revealed oocysts in the stomach.

The plan was excellent but the Bedonins did not like it before many days had elapsed they refused to take the plasmoquin and few of them took it for more than three days. The authors attribute this to a provocative effect of the drug upon latent infections. A case of haemoglobinuria made it advisable to interrupt the work in this region, and the blood was examined after treatment in only 19 cases. The authors consider the results encouraging but the treatment was followed in many instances by clinical attacks of malaria sometimes with serious effects in malignant tertian infections. In addition to the case of haemoglobinuria three others showed definite icterus consequently the authors conclude that great caution should be observed in administering the drug *en masse* and the work should be carried out only under the constant supervision and control of a physician.

W F

OTTOLENGHI (D) & BROZZU (G) El tratamiento preventivo con quinina y con otros medicamentos como medio profilactico en el paludismo experimental. [The Prophylactic Use of Quinine and other Drugs in Experimental Malaria].—*Medicina Paises Calidos* Madrid. 1929 May Vol. 2. No 3 pp 221-224 [Hyg Inst. Univ Bologna.]

The authors studied the question of quinine prophylaxis in experimental malaria with a view to its application as an antimalarial measure. The problems they put forward were (1) Will an individual who has been treated with quinine in small doses daily or a larger dose twice a week, become infected if subjected to the bites of infective anopheles? (2) After the mosquitoes have been allowed to bite if the quinine is suspended at different intervals, when will the attack occur?

The experiment was arranged thus. One group of subjects with mental disease but in good general health and no malarial history was given 40 cgm. of bisulphate daily for ten days 20 cgm morning and evening. On the third day they were subjected to the bite of an infected anopheles (proved by their being allowed to bite unprotected individuals and subsequently by dissection to demonstrate sporozoites in the salivary glands). A second group received 1 gm. of the bisulphate twice a week 50 cgm. twice on each day of treatment. In this group infection was allowed one day or five days before starting quinization with a view to determining the abortive value of this bi weekly method.

Other tests were made using plasmochin and plasmochin compound. The results of the few experiments made show that the sporozoites were not destroyed by the quinine given either before or immediately after inoculation also that the infection might remain latent while the treatment continued, but that when this was suspended attacks occurred typically at the end of the usual period of incubation or soon after and that a single infected mosquito could transmit infection. Delay was in some cases greater when plasmochin was employed.

Further investigations are to be undertaken to determine the effect of more prolonged treatment on latent malaria and the effects of repeated infection during the period of quinization.

H. Harold Scott.

REED (Alfred C.) *Malaria—a Practical Review—California & Western Med* 1929 Apr Vol. 30. No. 4 pp. 217-230 [Pacific Inst of Trop. Med. Univ of California, Berkeley]

In concluding his review of malaria, Dr Reed expresses the opinion that mosquito control should be followed as a local measure until better weapons are available but "a geographical survey of the tropical world shows at once its difficulties and the small impression on the total problem so far accomplished by it."

"The larger problem of the eradication of malaria as a foe of humankind lies beyond the horizon, by this method. If plasmoquin compound or an analogous drug proves as effective on wholesale use as it does now on a smaller scale we may well have in it the means for a really effective attack on the existence of malaria."

W F

WISCHNEVSKY (N. C.) [Quelques observations sur le tableau parasitaire et la formule leucocytaire dans la fièvre quarte pendant la quinquina] *Observations on the Parasitic Picture and Leucocyte Formula in Quartan Fever during Quinine Treatment.*—*Russian Jl. Trop. Med.* 1929 Vol. 7 No. 2 pp. 87-92. [5 refs.] [In Russian. French summary pp. 93-95.]

The author reached the following conclusion as the result of the examination of 15 cases: (1) The schizonts of *P. malariae* disappear from the peripheral blood in three or four days under systematic quinine treatment. The gametocytes disappear in eight to eleven days. (2) Before treatment there is generally a leucopenia. The neutrophils are decreased (300 to 2,500 per cmm). The lymphocytes are also decreased (786 to 1,646 per cmm) and so are the eosinophiles, to such an extent that it may be impossible to find any. The mononuclears are relatively increased, though their actual numbers remain within normal limits (201 to 356 per cmm). (3) During treatment and after the disappearance of the parasite, the number of white cells (neutrophils, lymphocytes, and eosinophils) increases. The mononuclears diminish in some cases, but in others they show a remarkable increase.

W F

ROSS (Ronald) *Malaria and Feeding.* [Correspondence].—*Jl. Trop. Med. & Hyg.* 1929 May 1 Vol. 32 No. 9 p. 132.

Sir Ronald Ross draws attention to an absurd notion which has been ventilated in the lay press to the effect that the way to prevent malaria fever is to feed the native more copiously and such a notion will certainly do harm should it encourage administrators and employers of labour to think that nothing else is necessary. [At the same time, it is amongst ill-fed populations that malaria is seen at its worst, and is most likely to appear in epidemic form. A country with a starving population can do little to combat malaria.]

W F

KARVE (D. S.) *Malaria in Pregnancy and Labour—Arya & East African Med. Jl* 1929 May Vol. 6 No. 2 pp. 43-49 [7 refs.]

This paper gives a good account of the deadly effect of malignant tertian malaria in pregnancy. Dr Karve's experience was gained

among the immigrant Indian women in Nairobi. He finds that benign tertian malaria causes little trouble, but the sub-tertian type is responsible for abortion haemorrhage and death. In 32 cases attended by him during the first six months of pregnancy 4 of the mothers died there were 24 abortions 4 cases of ante-partum haemorrhage, 2 still births and only 2 natural births. Even the prompt administration of quinine availed but little. Malaria during the last three months of pregnancy proved less disastrous there were only 3 abortions in 21 cases and 18 went to full term.

The interesting statement is made in this paper that malaria was rare in Nairobi until 1925 and the first serious epidemic occurred in 1926

W F

NAZARIO (R. C. Ruiz) Coincidence of Malaria and Typhoid Fever —
Porto Rico Rev of Public Health & Trop Med 1929 Feb
 Vol 4 No 8 pp 365-369

Owing to lack of agreement as to the frequency of the association of malaria and typhoid fever Dr Nazario undertook the investigation of this question in Porto Rico where epidemics of typhoid occur in malarious districts. Laboratory data were obtained of 63 cases of typhoid which occurred during such an epidemic and the record showed that malaria parasites were found in 11 of them. Judging from this and from the result of inquiries made among medical practitioners in Porto Rico and also from his own experience of cases seen in consultation with them Dr Nazario so far from finding himself in agreement with CRAIG (who considered that there was a certain amount of incompatibility between typhoid and malaria which caused the symptoms and the parasites of the latter to disappear during the febrile stage) came to the following conclusions it is not unusual to find coincident infection by typhoid fever and malaria typhoid is more frequent in localities where malaria is endemic and the symptoms are more severe when it is complicated by malaria.

W F

ZALLOCCO (A) Iolurie ed albuminurie nella malaria della infanzia.
 [Polyuria and Albuminuria in Malaria in Children.]—*Pediatrics*
 1929 June 15 Vol. 37 No 12. pp 647-654 [Inst. Clin.
 Pediatrics Univ Rome.]

REM-PICCI divides cases of malarial albuminuria into three categories: the febrile when this symptom occurs during or immediately following the attack post malarial when it follows some time after and cachectic in malarial patients without fever. Children differ from adults in these respects 100 children were examined and in 12 only was polyuria present, whereas in adults it commonly accompanies the cold stage. Albuminuria on the other hand, was noted in 26 children after the febrile attacks had ceased or who were in a cachectic state this is less often found in adults. The quantity of albumen was practically twice as great in the subtertian infection as in the benign.

H. Harold Scott.

ZALLOCCO (A) Le convulsioni nella malaria dei bambini. [Convulsions in Malaria in Children.]—*Pediatrics*. 1929 July 15. Vol. 37 No 14 pp 739-746 [Inst. Clin. Pediatrics Univ., Rome]

In many children of tender age convulsive attacks occur in malaria, particularly those of syphilitics, alcoholics, epileptics, and neurasthenics. They may occur at the beginning of the chill, or replacing it, or after a slight chill and during the fever and in "malarial meningeal states." The cerebrospinal fluid in the last may be clear but under increased pressure, without lymphocytosis, but with increased albumen. In other cases the leucocytes may be in marked excess, the fluid may be turbid, and there may even be a polymucleosis leading to a suspicion, if not actual diagnosis, of cerebrospinal fever but bacteriological examination is negative.

H. Harold Scott.

ZALLOCCO (A.) I disturbi del ritmo cardiaco nella malaria dei bambini. [Disturbances of Cardiac Rhythm in Malaria in Children.]—*Pediatrics*. 1929 Apr 15 Vol. 37 No. 8. pp. 428-437 [Inst. Clin. Pediatrics, Univ. Rome.]

Arrhythmia has repeatedly been observed in adults suffering from malaria. It may assume a bradycardia or tachycardia, as for example, in a case recorded by VITELLO where a woman of 48 years had a pulse of 75 per minute when the temperature was 39° C. but only 40-45 during the pyrexial attacks. The author now calls attention to similar disturbances in children. In those with vomiting, the change of rhythm may be due to vagus inhibition some, however show marked tachycardia, 120-140 beats per minute without any apparent distress. In others the pulse is slow and this is thought to be due to toxins acting on the bundle of His.

H. Harold Scott.

AKOWBIANZ (G.) Lésions rénales de l'origine paludéenne. [Lesions of the Kidneys due to Malaria.]—*Acta Univ. Turic. Medic.* Turkent 1928 Ser 9 Med No. 1 pp 1-12 [In Russian. French summary p 13]

The author points out that malaria, like other infectious diseases, may cause damage to the kidney which, though primarily of a degenerative character (a nephrosis) is often accompanied by acute and chronic inflammatory changes. He draws attention to the importance, under the conditions of life in Turkestan, of examining every case of renal disease for malaria, and states that quinine often has a marvellous effect in those which are due to it, particularly in the acute and sub-acute stages.

W F

PROTAKIS (B. A.) Veränderungen der Milz bei Malaria. [Alterations of the Spleen in Malaria.]—*Archiv f. Path. Anat.* 1929. Feb. 16 Vol. 271 No. 1 pp 194-196. [4 refs.] [Univ. Municipal Clinic, Athens.]

This is an investigation of the spleens of persons who have died of acute and chronic malaria. The newly formed cells of the spleen indicate the stage of the disease and the clinical form. Thus, if the cell increase

is exclusively of endothelial cells of the blood sinuses then it is a hyperacute malignant fatal form if of reticular tissue of the red pulp of the spleen then it is an acute variety if it is only of interstitial connective tissue then it is a chronic form In the hyperacute condition the growth of the R.E. cells causes an increase of the phagocytosis and deposit of iron

E. D W Greig

WOLSKI (M E) & SCHEWELEWA (E. M) Zur Frage der Bilirubinämie bei Malaria. [Bilirubinaemia in Malaria.]—*Arch f Schiffs u Trop Hyg* 1929 Apr Vol 33 No 4 pp 210-215 [17 refs]

In acute febrile malaria where diagnosis is almost always in little doubt the bilirubin content of the blood is raised in chronic cases where doubt may exist it is not higher than normal. It has no relation to the species of plasmodium the degree of infection or the size of the spleen.

C. L.

NAVARRO (Antonio) & SPANGENBERG (Jacobo J) Asma palúdica Una observación clínica y algunos comentarios [Malarial Asthma.]—*Semana Méd* 1929 May 2 Vol 36 No 18 (1842) pp 1111-1114 [8 refs]

The patient, a man of 43 years had suffered for five years from bronchitis and suffocative attacks which became more frequent till during the last year they recurred daily towards noon and were very severe Scanty malarial parasites were found in the blood and quinine was given. After three days the attacks diminished in severity and after a week they disappeared altogether The author concludes that malaria may manifest itself with anaphylactic phenomena urticaria paroxysmal haemoglobinuria, asthma and suchlike

H Harold Scott

BONKE (C) & ROSEKOTT (E R A Luyke) Een geval van Malaria haemorrhagica. [Case of Haemorrhagic Malaria.]—*Geneesk Tijdschr v Neder Indi* 1929 Feb 20 Vol 69 No 2 pp 170-176 With 1 plate [8 refs]

A case of subtertian malaria in a Chinese who died a few hours after admission to the hospital He showed haematemesis serious melæna and several haemorrhagic patches in the skin The post mortem examination revealed no cause for the haemorrhagic condition, but the malaria infection itself. Microscopic examination of the mucous membrane of the gut showed that the capillaries were crammed with parasites. Contrary to what is regularly found in comatose malaria only few parasites were found in the capillaries of the brain. The haemorrhagic type of malaria is to be distinguished from dysenteric malaria the existence of which type is maintained by many authors denied by others

W J Bals

NETTER (L) Un cas de paludisme accidentel [A Case of Accidental Malaria.]—*Bull Soc Path Exot* 1929 May 8 Vol. 22. No 5 pp 318-319

Dr Netter reports the case of a young woman, recovering from an operation in Paris who consented to be a donor of blood to a man in the

same hospital who had been invalided from one of the French Colonies. The transfusion was performed with a Jubé syringe. Eleven days later the woman had an attack of benign tertian malaria. She had never been to the Colonies herself, nor had she ever suffered from any illness apart from that which made her operation (hysterectomy) necessary.

W F

DECRAPARIDZE (P) [Zur Frage der Artenspezifität bei Malaria.] [*Species Immunity in Malaria.*].—*Nachrichten d. Tropischen Medizin*. Tiflis. 1929. Mar. Vol. 2. No. 3. [In Georgian script. German summary pp. 280-281.]

The investigations of the author in the districts of high endemicity Gali and Gudauti (Georgia) are communicated. He concludes that a relative malarial immunity can develop in the endemic area, if it has been populated for a considerable time if no fresh arrivals are added to the population, and, also, if there is not a floating population. He considers that the relative immunity is strongly specific for each species of the malarial parasite. The immunity produced by *Plasmodium vivax* lasts longest and is the strongest whilst that produced by *P. falciparum* is much weaker if any is produced at all. He had very little material to settle the question of the immunity produced by *Plasmodium malariae* but he thinks it occupies an intermediate position between the other two species in this respect. Therefore, in discussing malarial immunity one must always refer to the species of parasite.

E. D W Greig

SORSILO (R) The Experimental Susceptibility of *A. rossii* for Malarial Infections.—*Meded. Dienst d. Volksgezondheid in Nederlandsch Oost-Indië*. 1928. Vol. 17. Pt. 4. pp. 509-514. [10 refs.] [Med. Lab. Weltevreden.]

Soesilo shortly reviews the literature dealing with the very varying reports of natural infection of *A. subopacus* with malaria. He recalls the finding of WALCH & SARDJITO [*Geneesk. Tijdschr. v. Neder-Indië* 1928. Vol. 68. p. 247] that this mosquito is with reluctance anthropophagous. He shows that whether the larvae have lived in fresh or salt water the infection to experimental feeding has not been less than 80 per cent. and concludes that the degree to which the mosquito is found infected in nature is a measure not of susceptibility to infection but of preponderating zoophily.

C. L.

I. RUCA (M) BALLIE (L.) & VIERU (M) Sur la biologie de l'hématozoaire de Laveran dans l'infection expérimentale par le sang virulent [*Biology of Plasmodium in Infection with Virulent Blood.*].—*C. R. Soc. Biol.* 1929. Mar. 1. Vol. 100. No. 8. pp. 573-575.

II. — — — Evolution des formes sexuées dans l'infection malarique expérimentale par transfusion de sang virulent.—*Ibid.* pp. 576-577. [1 ref.]

I. Experimental infection means here that there was injection by syringe of malarial blood. Of 28 tertian cases, schizonts and gametocytes appeared simultaneously in 19 gametocytes followed

schizonts within 5 days in 5 and preceded them by 3 days in 1. In 37 quartan cases gametes and schizonts appeared simultaneously as also in 6 of 20 subtertian cases.

11. It is believed that the gametocytes were already being formed in the blood of the donor

C. L.

SORGE (Giuseppe) *Ricerche parassitologiche comparative fra sangue periferico e midollo osseo in malarici* [Examination for Parasites in the Peripheral Blood and Bone-Marrow in Malaria].—*Riforma Med* 1929 July 29 Vol. 45 No 26 pp 872-873 [Med Clinic, Univ Catania]

Nine patients were observed. Blood-smears and smears of marrow withdrawn from the sternum at the same time were examined. In five of them no parasites were found even after prolonged search. They had been seen previously in the peripheral blood and quinine had been given. In two of the remaining four they were numerous in the blood, three or four in each field while in the marrow though present they were very few one or two in a smear. In the other two they were found in the blood but were absent from the marrow. Hence it is concluded that examination of marrow from the sternum is not a useful method of diagnosis. If found at all the parasites are in smaller numbers (segmenting forms or gametes) than in the peripheral blood.

H. Harold Scott.

SINTON (J. A.) & BIRD (W.) *Studies in Malaria, with Special Reference to Treatment. Part XI. The Cinchona Alkaloids in the Treatment of Benign Tertian Malaria.*—*Indian J Med Res* 1929 Jan. Vol. 16 No 3 pp 725-746 [23 refs.] [Malaria Treatment Centre Malaria Survey of India, Kasauli.]

This paper summarizes the result of the treatment of over 1300 cases of benign tertian malaria during five years the patients being subsequently examined microscopically for 8 weeks. Fresh infections relapse less frequently after treatment than do chronic ones and in them the quinine and alkali course seems more efficacious than quinine alone. For chronic infections this last does not hold and for them the following average relapse rates were obtained. For quinine (667 cases) 68 quindine (208) 83 cinchonine (72) 67.6 cinchonidine (107) 68.7 cinchona febrifuge (110) 73.1. Apart then from quindine the other crystalline alkaloids and their combination as cinchona febrifuge were equally effective a confirmation of the great economic importance of this cheaply prepared preparation.

C. L.

HOCKETT (A. J.) *The Effect of Alkalis upon the Solubility of Quinine Salts.*—*Proc Soc Experim Biol & Med* 1929 Apr Vol 26 No, 7 pp 613-614 [4 refs.] [Med. School, Univ of Oregon, Portland.]

The author sought to determine the solubility of quinine hydrochloride bishydrochloride, and bisulphate in solution of alkaline salts at various concentrations and pH when equal parts of a 2 per cent.

quinine salt and an alkaline salt were mixed. It was assumed that the concentration of quinine in the stomach and duodenum, after a therapeutic dose was approximately 1 per cent. The pH values of the average precipitation points were as follows: quinine hydrochloride 7.19, dihydrochloride 3.62, bisulphate 3.46. These are almost in the same relation as the pH values of their 2 per cent. aqueous solutions, which are respectively 6.1, 2.6 and 2.4. These figures are said to be within the pH ranges of the human stomach and duodenum. The author concludes that the results "seem to justify the statement that physiological concentrations of alkalis definitely alter the solubility of amounts of quinine salts corresponding to the full therapeutic dose as found in the upper gastro-intestinal tract."

W F

LEGA (G.) Il chineto la cinchonina, la chinidina nella cura della malaria. (*Quinestum, Cinchonina and Quinidine in Malaria Treatment.*)—*Riv di Malarologia* 1928. Sept.-Oct. Vol. 7 No. 3. pp. 629-658. With 10 graphs in text. [34 refs.] [English summary pp. 843-844. R. Inst. of Clin. Med., Rome.]

This paper concerns the results of the comparative treatment of 140 patients with cinchonine, quinidine and two kinds of Government manufactured quinetum which contain quinine, cinchonidine and cinchonine. Quinetum showed itself almost as efficacious as quinine, and quinidine proved even better, but the results with cinchonine were not in accord with those of recent English workers for it proved of little therapeutic value.

W F

FREY (A. Mark) Plasmoquine and Plasmoquine Compound in Treatment of Malaria.—*Jl Trop Med & Hyg* 1929. June 15. Vol. 32 No. 12. pp. 165-169. 22 refs.]

The author treated 511 cases with plasmoquin or plasmoquin compound. Plasmoquin alone was employed in 139 cases. In common with other observers, he found that plasmoquin gave excellent results in the treatment of benign tertian and quartan malaria. It was noticed that patients suffering from chronic malaria who continued their usual working life tolerated plasmoquin better than in-patients. Abdominal pain and faintness during treatment were corrected or prevented if the plasmoquin was not given on an empty stomach. Adrenalin in solution was given to patients who showed signs of suprarenal insufficiency (arrhythmia?).

The results of the treatment of mixed tertian infections was less satisfactory. Eight out of nine patients relapsed while they were under treatment. One patient showed signs of intoxication after receiving 0.26 gram of plasmoquin in three days. After the drug had been suspended for two days and the alarming symptoms had cleared away 0.1 gram was given daily for two days. Its administration was again followed by intense hæmoglobinuria and cyanosis: the finger nails and toes became black, the face and the skin of the whole body greenish, and the pulse irregular. The drug was stopped, the patient revived after an injection of glucose and adrenalin, and finally recovered from her malaria without further treatment.

Plasmoquin compound was given to 298 patients the usual dose for adults being 0.06 gram of plasmoquin with 0.75 gram quinine sulphate daily. Children tolerated the drug excellently and its action in chronic sub-tertian infection was most striking and gave results which could never be obtained with quinine alone. [It is hard to reconcile this conclusion with the admission that in one of the reported cases, sub-tertian parasites were present after twenty-six days continuous treatment with plasmoquin compound.]

W F

WALRAVENS (P) in collaboration with VALCKE (G) & BEQUAERT (M) Observations concernant le traitement de la malaria par la plasmoquine. [Treatment of Malaria by Plasmoquin.]—*Bruxelles Méd* 1929 June 16 Vol. 9 No 33 pp 939-943 [Hosp & Lab of Bact Elizabethville, Belgian Congo]

Malarial infections among the European population of Katanga are almost always due to *P. falciparum*. The writers treated fourteen cases with plasmoquin compound giving six tablets a day for three periods of five days each separated by intervals of the same length and following this up by three similar courses of three tablets daily. The treatment was successful except in one case where there were alarming symptoms of intolerance pallor blueness of the lips fugitive oedema of the face and feet swelling of the veins of the feet, vertigo and headache. The parasites persisted in this case and quinine injections were given in place of plasmoquin.

W F

GREEN (Richard) I.—The Treatment of "Crescent Carriers" with Plasmoquine Compound. II.—The Treatment of Quartan Malaria with Plasmoquine. III.—The Treatment of Malaria with Dimeplasmin.—*Bull Inst Med Res Federated Malay States*. 1929 No 3 34 pp With 1 coloured fig [47 refs]

— Treatment of Malaria with Dimeplasmin.—*Lancet* 1929 June 1 pp 1137-1138 [1 ref]

Part I. The examination of 250 Asiatic patients who were under going routine treatment for subtertian malaria with 30 grains of quinine sulphate daily in the District Hospital at Kuala Lumpur made it evident to Dr Green that this treatment was unsatisfactory from a public health point of view. The patients remained in hospital on an average for 7 1/2 days which was long enough to relieve their symptoms and to clear the blood of trophozoites but, as carriers of malaria they were more dangerous than before treatment was begun for while 50.4 per cent. had crescents in their blood on admission to hospital 64 per cent. had crescents when they were discharged. To remedy this state of affairs Dr Green tried the effect of plasmoquin compound. Fifty-six Asiatics with crescents in their blood, weighing on an average 46 kg were given tablets of plasmoquin compound equivalent to a daily amount of 0.04 gm. of plasmoquin and 0.5 gm. of quinine sulphate with the result that the crescents disappeared within four to thirteen days, the average disappearance time being 7.9 days. In several of the cases however trophozoites persisted in spite of the treatment.

In a control series treated with 30 grains of quinine daily no trophozoites were found later than the third day but, in all cases, crescents persisted as long as the patient could be induced to remain in hospital. No toxic symptoms were found in this series of 56 patients treated with plasmoquin. Abdominal pains occurred in 3 cases, but appeared to be relieved by giving a large amount of fluid with the tablets. Slow pulse-rates occurred, but they were also noted in malarial patients under treatment with quinine and in a series taking neither plasmoquin nor quinine. Plasmoquin had no apparent effect on the blood pressure, and there was no evidence that it caused albuminuria. As the result of his investigation, Dr. Green concludes that a twelve-day course of treatment with 0.04 gm. of plasmoquin and 20 grains of quinine daily would be an advantage from an epidemiological point of view in subtertian cases with crescents in the blood. But he points out that it would cost twice as much as the present standard treatment in the Kuala Lumpur hospitals which consists of 30 grains of quinine sulphate daily a course of twelve days duration costing approximately eighteen pence. He considers that, in its present form, plasmoquin compound is not a well-balanced drug, because one cannot give sufficient quinine without giving too much plasmoquin. This difficulty can be avoided, but at some inconvenience, by giving the two drugs separately. He points out that in treatment with plasmoquin, continuous medical supervision is necessary in view of the narrow margin between the effective dose and the toxic dose.

Part II. The action of plasmoquin in quartan malaria was also investigated, by the administration of 0.06 gm. daily to 40 patients, with a control group on a daily dose of 20 grains of quinine. The young trophozoites disappeared within a few days in both series, but the gametocytes persisted in some of the cases on quinine treatment, whereas they were soon destroyed by plasmoquin.

Part III. Dr. Green has recently investigated the effect of *Dine-plasmin* in the treatment of malaria. It is said to be a synthetic remedy of the plasmin group made by the manufacturers of plasmoquin, who state that it has a destructive effect on the plasmodia of bird malaria, and is less toxic than plasmoquin. It is still in the experimental stage and is not on the market. In a group of eleven cases, comprising all types of malaria, the drug was found to have no effect upon the parasites or the symptoms.

W F

STERN (E.) Meine bisherigen Erfahrungen mit dem Plasmochin.
[Plasmochin Treatment of Malaria.]—*Arch. f. Schiff- u. Trop.*
Hyg. 1929 May Vol. 33. No. 5. pp. 273-276.

The investigations were conducted in Palestine where the author had a fairly large number of cases of malaria of all three varieties. [Exact figures are not given.] Blackwater fever is very rare. At first he gave 8 tablets of plasmochin = 0.16 gm. in the 24 hours. Some of the cases so treated had pretty marked cyanosis of the skin and visible mucous membranes. Also some complained of oppression over the heart and pain in the stomach. Since reducing the dose to 0.10 gm. for adults and 1-1½ cgm. for children he has had no cases of cyanosis or oppression. His experiences enable him to affirm (1) That doses of 0.06 gm. per day for adults and 0.01 gm. for children cause rings to disappear from the blood and the symptoms to clear up after 2-4 days

treatment. (2) In 3-4 days treatment with plasmochin compound the schizonts and gametes of *Plasmodium falciparum* were markedly altered. (3) In pregnancy plasmochin is remarkably well tolerated. (4) Also nervous patients stand plasmochin much better than quinine. (5) The bitter taste in the mouth, the ringing in the ears the tendency to faint the urgent desire to micturate which sometimes follows quinine administration are not met with after taking plasmochin. The records of 4 cases are given.

E. D W Greig

TANEV (I) & HASCHNOW (G) Zur Behandlung der menschlichen Malaria mit Plasmochin. [Treatment of Malaria with Plasmochin.] —*Muench Med Woch* 1929 July 28 Vol 76 No 30 pp 1243-1246 With 1 chart in text. [State Hosp Burgas Bulgaria.]

Over 200 cases partly in hospital and partly in private practice were observed. Most were chronic. The doses given were those recommended by Professor MÜHLENS namely plasmochin 0.02-0.09 gm. per day. In a few cases marked cyanosis was observed also pain in the stomach without vomiting, and pain in the heart region. The secondary symptoms were noted particularly in nervous persons. In only 3 cases out of the 200 was it necessary to stop the plasmochin treatment. Blood examinations were made on each day of fever thick films being used for the purpose. The following conclusions are reached (1) In most cases plasmochin acts rapidly and certainly on the gametes. They disappear from the blood after 3 to 8 days of treatment. (2) On the rings, on the contrary plasmochin has a weaker and slower action than quinine. (3) In blackwater fever plasmochin is particularly valuable and also in cases of quinine idiosyncrasy. (4) The action of plasmochin on old-standing splenic enlargement is not better than quinine and usually is not noteworthy. The action on splenic enlargement of recent origin is good. (5) In the prophylaxis of malaria it has great value by destroying the gametes in the peripheral blood. The histories of a number of cases of malignant and benign tertian malaria are recorded. Also the temperature chart of a case of blackwater fever is given.

E D W Greig

DE MELLO (Froilano) Indicações do emprego da plasmochina na terapêutica e na profilaxia da malária. [Plasmoquin in Treatment and Prophylaxis of Malaria.]—*Bol Ger Med e Farmacia* Bastora. 1929 Jan.-Apr Ser 13 No 1-4 pp 9-16

The author treated patients infected by the several parasites of malaria singly and in conjunction and followed them up for a period of six months. The dosage and mode of treatment were those of MÜHLENS. He found that those who went to live in non malarious districts had no recurrences some of those who remained exposed to infection became re-infected (believed to be fresh infections) and in 17 per cent. the attacks recurred. He proposes a scheme for further study of the question. Two malarious districts more or less isolated to be chosen, of some 150-200 inhabitants the nature of infection to be determined, antimalarial measures to be undertaken at the same

time, and the patients to be treated with plasmoquin compound and the effects noted until the end of the succeeding period of malarial seasonal prevalence.

H. Harold Scott.

MAJUMDER (A. R.) Some Observations on Plasmochin.—*Jl. Trop. Med. & Hyg.* 1929 Feb 15 Vol. 32 No. 4 pp. 47-49

The writer reports on a free supply of plasmochin which he obtained from the makers local agent. In some cases it was given intramuscularly the injection being painless. The dose is stated as being "0.03 gr" but since two doses are held equivalent to "1 gr" the first figures evidently refer to grains and the second to grams. Intramuscular injection of "0.03 gr" daily for three days did not reduce the temperature to normal but double this quantity appears to have done so. A child of 2½ years was inadvertently given within two hours 1 gr—the adult dose. Luckily there were no symptoms."

C. L.

NISSEYBAUM (B.) Zur Behandlung der Malaria mit Plasmochin. [Treatment of Malaria with Plasmochin].—*Wien. Klin. Woch.* 1929 Mar 7 Vol. 42 No. 10 pp. 300-305. With 8 charts [2 refs.]

The writer's conclusions on 100 cases are that plasmochin is an excellent medicament for tertian and quartan malaria, giving fewer relapses than does quinine. It is the first preparation which has been found to attack crescents and should replace quinine in kiliocycrasy and resistance to that drug, in pregnancy and perhaps in blackwater fever. Study of the body of the paper shows, in the heavy dosage used, deep cyanosis and that methaemoglobinæmia was not detected seems of minor importance in view of the fact that others have demonstrated its presence so conclusively.

C. L.

WISSALADZE (Sp.) [Plasmochin und seine Bedeutung in der Malaria-therapie] (Plasmochin and its Significance in Malaria Treatment).—*Nachrichten d. Tropischen Medizin* Tiflis 1929, Dec. Vol. 1 No. 2. [In Georgian script. German summary pp. 221-222.]

An experience of plasmochin in 21 subtertian, 31 tertian and 22 quartan cases leads to conclusions in general accord with the experience of others. Its success is held probably to be greatest in quinine kiliocycrasy and blackwater fever. Its toxic results make essential the closest individual scrutiny of those taking it and preclude its wide use. The many relapses which follow it indicate that it should be combined with quinine.

C. L.

RAYNAL (Jean) Traitement du paludisme par le quinio-stovarsol. [Treatment of Malaria by Stovarsol Quinine].—*Marseill. M. J.* 1929 Mar 15 Vol. 66 No. 8 pp. 361-434. With 27 charts [3 pages of refs.]

These observations were made during the treatment of soldiers in hospital in Marseilles most of whom had contracted malaria in Syria or Morocco. Quinio-stovarsol (oxycetyl-amino-phenylarsinate of

quinine) first prepared by FOURNEAU and TRÉFOUEL, is manufactured by the firm of Poulenc Frères in the form of tablets each containing 0.25 grams. According to Dr Raynal it consists of stovarsol and quinine (54.9 per cent.) in approximately equal proportions.

The drug was given in three or four courses of 10 days duration separated by intervals of 5 days. The daily dose was 4 tablets equal to 1 gram. These doses were well borne but because slight symptoms of intolerance in the form of erythemata and giddiness occasionally arose the author recommends careful watching and that a daily dose of 1.50 grams should not be exceeded. Quartan parasites disappeared within 60 hours, in the only two cases treated whether they relapsed was not known. Benign tertian parasites both schizonts and gametocytes, quickly disappeared but 8 out of 10 cases relapsed during the course of a few months. The effect of the drug on the anaemia, the general condition of feebleness and the gastro-intestinal troubles of chronic cases was so excellent that Dr Raynal recommends it in preference to either quinine or stovarsol alone. In sub-tertian malaria schizonts disappeared within forty-eight hours under treatment, and crescents within 10 to 38 days. There were no relapses in sub-tertian cases, after thorough treatment. In grave acute malaria, where immediate action is required, Dr Raynal recommends treatment by injections of quinine salts. It is in chronic, cachectic malaria that he considers quinio-stovarsol of the greatest value.

W F

RUDOLF (G de M) *Sulfarsenol in Malaria.*—*Rev de Malariologia.* 1929 May-June. Vol. 8. No 3 pp 260-261

Three patients infected with benign tertian malaria by means of anopheline mosquitoes were treated with sulfarsenol in total amount varying from 66 to 84 centigrammes. The fever stopped and the parasites disappeared within a few days but after periods varying from 21 to 204 days relapses occurred in each patient

W F

Row (R.) *The Fate of the Merozoites seen in the Cultures of Malarial Parasites.*—*Indian Med Gaz* 1929 Mar Vol. 64 No 3 pp 142-144 With 4 text figs [F D Petit Lab Byculla, Bombay]

It is held that the conditions unfavourable to culture of malaria parasites are specific serum reaction phagocytosis, nutritional deficiency of serum and toxic contamination while the desiderata are vigorous parasites from a fairly fresh infection glucose serum unaltered otherwise a fair supply of erythrocytes fairly rich in haemoglobin freedom from leucocytes, and rigid asepsis

C L.

Row (R.) *On some Observations on the Malarial Parasites grown Aerobically in Simple Cultures with Special Reference to the Evolution and Degeneration of the Crescents.*—*Indian J Med Res* 1929 Apr Vol. 16. No. 4 pp 1120-1127 With 2 coloured plates. [5 refs.] [F D Petit Lab. Byculla, Bombay]

Cultures obtained by the regular technique of Bass and Johns and by all modifications of them, yield only one single first crop and no

satisfactory sub-cultures. The author therefore employs a simple aerobic method. Such cultures show that schizogony yields different numbers of merozoites at different stages of the disease. If the blood of a newcomer to a malarious district be cultivated during his first paroxysm, a large number of merozoites is formed but, with each successive paroxysm their number becomes less, until a time is reached when one merozoite entering one red blood corpuscle gives rise to no more than one merozoite of the next generation, and at this point gamete production begins. On the hypothesis that the ultimate disappearance of the crescent is due to the production of an antibody Dr Row has prepared a vaccine from crescents. The results, in six cases, are shown in tabular form the crescents disappeared with periods varying from four days to four weeks.

Coloured plates are given illustrating recovery from an attack of malaria, followed in cultures made from the blood at different stages. For example a culture made during the second paroxysm, showing a schizont with many spores a culture at the fourth paroxysm, in which the number of spores is much reduced a culture at a still later stage, in which no schizonts have developed because immune bodies are present in the patient's blood. Another plate shows what is interpreted as the development of the crescent from the ring.

W F

HOROVITZ (A) & SAUTET (J). Remarques sur la culture des parasites du paludisme. [Cultivation of Malaria Parasites.]—*Ann. Parasit. Humaine et Comparée* 1929 Mar 1 Vol. 7 No. 2 pp. 151-160 With 1 text fig. [33 refs.] ("Salpêtrière Hosp. & Parasit. Lab. Faculty of Med. Paris.)

Techniques for the culture of malaria parasites have become increasingly complicated, without giving better results. The writers describe a simple procedure with simple material which has given results comparing favourably with those obtained by the techniques of BUN & JONES (1917) ROW (1917) SIXTON (1922) ROW (1928). They have found no evidence of increase in numbers of parasites in the cultures and no certain evidence of multiplication. The gamete stage is often attained. All three species of *Plasmodium* were used.

C. L.

MULLIGAN (H W). Studies on the Reticulo-Endothelial System with Special Reference to Malaria. Part I. Introductory Part II. The Large Mononuclear Cells in the Peripheral Blood in Malaria.—*Indian J. Med. Res.* 1929 Apr Vol. 16. No. 4. pp. 1069-1108. [25 refs.] pp. 1107-1119 With 1 coloured plate. [38 refs.]

Part I of this paper deals with the various physiological functions which have been attributed to the reticulo-endothelial system. It is intended, in a later series of articles, to study the relationship of these functions to malaria. In a historical survey the author relates how the system of scattered mononuclear phagocytic cells, known as the reticulo-endothelial system, has come to be regarded as an organ with definite anatomical distribution and certain physiological functions. He

emphasizes the importance of the work of RIBBERT who by a method of vital staining with lithium carmine, mapped out this system of highly phagocytic cells those specially stained by this method being the endothelial and reticulum cells of the spleen, bone-marrow and lymph-nodes the K  pffer's cells of the liver the reticulum cells of the thymus glands certain connective tissue cells, and also the large mononuclear cells of the circulating blood. He sums up the functions of the system as being related to —

- i Regulation of certain formed elements of the blood.
- ii. Blood destruction and bilirubin formation.
- iii. Chemotherapeutic action of drugs.
- iv Immunity and anaphylaxis.
- v Certain metabolic activities

Within recent years it has been found possible by means of massive injections of Indian ink colloidal suspensions etc. to throw the reticulo-endothelial cells out of action the effect being commonly known as blockage

Part II of the paper reviews the opinions of different writers on mononucleosis and leucocytosis in malaria and points out that the diversity of opinion with regard to them is easily understood when it is remembered that there is no unanimity as to the exact type of cell which should be recorded as a mononuclear [The excellent figures given in modern text books such as those of MANSON and STITT have done much to remove this difficulty and to establish uniformity of practice in blood counting] Captain Mulligan gathers from the study of the literature on the subject that there is no clear conception of the nature and origin of the mononuclear cells, and that as most of the investigations have been made with Romanowsky's stain further progress must take place along new lines. In view of recent observations he employed (a) the phagocytosis of carbon *in vitro* (b) supra vital staining with neutral-red and Janus green (c) peroxydase staining with benzidine Details of the methods are given. Two series of cases were examined—one suffering from acute and one from chronic malaria—the first consisted of young European soldiers suffering from chronic benign tertian malaria the second consisted of Indian sepoys and included cases of all three forms of malaria, mostly in the acute stage As a result of these investigations Captain Mulligan concluded that—The reticulo-endothelial cells in the peripheral blood are increased in both acute and chronic malaria. These mononuclear cells include clasmatocytes (mononuclear cells staining diffusely with neutral-red) monocytes (in which the neutral-red is aggregated in little rosette clumps within the cell) and also cells which give a positive peroxydase reaction. The increase in clasmatocytes was found to be less in chronic than in acute malaria.

W F

YANG (C. S.) & BERGLUND (Hilding) Difference in Reticulocyte Behavior in Anemia from Malaria and in Pernicious Anemia.—*Proc Soc Experim Biol & Med* 1929 Mar Vol. 26, No. 6, pp 417-418. With 1 chart in text [Peking Union Med. School, Peking, China.]

The authors examined a case of untreated tertian malaria with a red blood count of less than one million. Reticulocytes formed 23 per cent.

of the cells, which showed that the count was being maintained at this level by a lively blood regeneration keeping pace with the destruction wrought by the malaria parasites. In pernicious anaemia, with a similar number of erythrocytes, they found less than one per cent. of reticulocytes showing that little blood regeneration was taking place from this they argue that pernicious anaemia cannot be a haemolytic anaemia as under such circumstances the blood count could not be maintained at this low level in the absence of regeneration. The administration of quinine in malaria sufficed to produce recovery by stopping the blood destruction. After five days treatment eosinophiles increased from about 4 to more than 20 per cent., and similar eosinophilia was observed in pernicious anaemia when treated with liver extract.

W F

CORRAO (A.) La formula leucocitaria nel periodo d'incubazione della malaria sperimentale [The Leucocytes in the Incubation Period of Experimental Malaria. — *Polichinico Sez. Med.* 1929, July 1, Vol. 36, No. 7, pp. 375-384. 2 pages of refs.] [Inst. of Clin. Med. Univ. Rome]

It is generally held that a person who has recently suffered from malaria shows a leucopenia with a relative mononucleosis and that this is obvious after four to eight attacks. The author injected fairly large doses, 8-10 cc. of blood containing subtertian parasites into three adults and examined smears of their blood at frequent intervals between the inoculation and the appearance of febrile attacks. He found that the change in the leucocytic formula preceded the onset of fever and was the first sign to appear being present before any parasites were seen in the blood. He did not observe any difference in the conditions found in the blood of patients inoculated with parasites from individuals who had been treated with large doses of quinine and containing crescents, and from those injected with blood containing schizonts, the subjects having received small doses of quinine.

H Harold Scott.

WOLSKI (M. E.) & SCHEWELEWA (E. M.). Die Blutmengebestimmung in Fällen mit vergrößerter Malaria milz. (Estimation of Quantity of Blood in Cases of Malaria with Enlarged Spleen.)—*Arch. / Schiff's u. Trop. Hyg.* 1929, May, Vol. 33, No. 5, pp. 269-273. [5 refs.]

As certain observers had found that the total quantity of blood was higher in diseases with enlargement of the spleen, the authors undertook the determination of the total quantity of blood in 51 cases of malaria with enlarged spleen. The degree of enlargement varied from one to six fingerbreadths. The method employed was that of Griesbach. They found that in healthy persons the total quantity of blood was 1.6 per cent. of the body weight. The results of the observations are set forth in two tables. The estimations showed that the total quantity of blood in these malarial cases was not higher than that of normal persons.

E. D. W. Greig

BARBER (M. A.) KOMP (W. H. W.) & NEWMAN (B. M.) **The Effect of Small Doses of Plasmochin on the Viability of Gametocytes of Malaria as measured by Mosquito Infection Experiments.**—*Public Health Rep* 1929 June 14 Vol. 44 No 24 pp 1409-1420 [12 refs.]

In these interesting experiments which were conducted in the Panama Division of the United Fruit Company the authors found that a very small dose of plasmochin quickly rendered a crescent carrier non-infective. *Anopheles (A. albimanus)* were fed upon five patients with crescents in their blood and in each case the mosquitoes became infected. One or two doses of plasmochin were administered and, after an interval mosquitoes were again fed upon the patients but this time the results were always negative.

The following is an outline of three of the experiments —

Case No 1 Infected all the five mosquitoes fed upon him. He was then given 4 cgm. of plasmochin and 22½ grains of quinine. On the following day there was no decrease in the number of crescents yet none of the mosquitoes which fed on him became infected. Fresh batches of mosquitoes were fed during the two following days with the same negative result though no more plasmochin had been administered.

Case No 2. Infected eleven out of seventeen mosquitoes. The same evening he was given 5 grains of quinine and on the following day 10 grains. On the evening of the following day he infected 4 out of 6 mosquitoes. On the morning of the third day he was given 1.5 cgm of plasmochin and twelve hours later 16 mosquitoes were fed on him this time none was infected. The crescents had decreased but little in numbers there was no change in their appearance but they failed to infect. No more plasmochin was given, and the feedings were repeated daily for the next three days each time with negative results.

Case No 3 Infected 4 out of 14 mosquitoes. He was then given a very small dose of 0.5 cgm of plasmochin. No quinine was administered in this case. About 24 hours later the number of crescents in his blood had increased, but though they were alive as proved by their exflagellation in mosquitoes' stomachs, yet they failed to infect any which imbibed the blood containing them.

The authors consider it probable in the light of their experiments that a single dose of plasmochin is effective on crescents for a period of several days although rings remain in the blood and they suggest that the very small doses which have been found necessary could be safely used for mass treatment. They conclude that their experiments indicate that amounts of plasmochin within the limits of safety are effective against gametocytes and may be combined with quinine (and caution) in the treatment of populations.

W. I.

SCHWETZ (J.) with COLLART (A.) & GEERNICK. **The Sporozoite and the Zygote Index of the *Anopheles* of Stanleyville (Congo-Belge)** — *Trans Roy Soc Trop Med & Hyg* 1929 Mar 9 Vol. 22 No 5 pp 457-463

The most numerous and widely distributed local anopheles species is *A. gambiae* (*A. costalis*). There also occur *A. mls*, *A. marshalls* var. *moucheti*, *A. funestus*, *A. obscurus* and *A. mauritanus*. The last two are

exceedingly rare. The first four transmit malaria. It was not previously known that the second and third did. The findings are as follows —

	Numbers examined	Percentage infected	
		Salivary glands	Stomachs
<i>A. gambiae</i>	992	11.5	8.4
<i>A. nili</i>	182	5.3	10
<i>A. marshalls</i> var. <i>moucheti</i>	154	4.5	4.5
<i>A. fuscus</i>	191	4.2	3.1

It is stressed that in isolated catches the percentage of infected mosquitoes is pure chance

C. L.

- i. HENRY (A. V. F.) Nouvelle technique de ferroflocculation pour l'étude sérologique du paludisme [Ferroflocculation in the Serodiagnosis of Malaria.]—*C R Soc Biol* 1929 Mar 8. Vol. 100. No. 9 pp. 671-674 [1 ref.]
- ii. — Les méthodes photométriques de séroflocculation dans le diagnostic du paludisme (photométrie de la ferroflocculation). [Serodiagnosis of Malaria by Photometry of Ferroflocculation.]—*Ibid* 1929 May 31 Vol. 101 No. 18. pp. 259-261. [*ref.]
- iii. — Le diagnostic du paludisme par la photométrie de la mésoflocculation [Photometric Serodiagnosis of Malaria by Mesoflocculation.]—*Ibid* pp. 261-264 [1 ref.]

i. Malarial sera have been found to give flocculation reactions with solutions of metharfer albuminate of iron and with suspensions of melanin. It is exceptional to find reactions of such intensity in diseases other than malaria, and therefore they may be reckoned as specific, although they will not do away with the necessity of microscopic examination of blood films. In general, albuminate of iron is intermediate in sensitiveness between the more sensitive melanin and metharfer. The test is as follows —

(1) Set up a series of 6 tubes, each containing 0.2 cc. test serum. (2) Add to the tubes in their serial order 1 cc. of the reagents, 1-450 metharfer in double distilled water 1-4800 albuminate of iron in double distilled water, 1-6000 albuminate of iron in double distilled water double distilled water (control) 1-4800 albuminate of iron in 1-1000 salt solution and 1 1000 salt solution (control) respectively. (3) Place the tubes in the incubator at 37° C. for 1½ hours. (4) Read the results.

With positive serums the metharfer tubes show rather voluminous flocculi, while the flocculation is of a finer character in the albuminate tubes. Simple opacity doubtful and slow reactions are to be rejected as non-specific.

ii. The photometer "is an instrument capable of measuring slight variations of flocculation with very small quantities of serum. The test is set up with solutions of "metharfer" and of albuminate of iron in the same way as already described, but with the addition of the following control tubes 1-450 metharfer 1-4800 albuminate of iron and 1-6,000 albuminate of iron in which the place of 0.2 cc. test serum is taken by 0.2 cc. normal salt solution. After being in the incubator

for 30 minutes the tubes are removed, shaken up and the mixtures tested in the photometer for optical density. These mixtures are then returned to their tubes and replaced in the incubator for the set time required in the previously described flocculation test. Optical density readings according to the photometric scale in both metharfer and albuminate of iron tubes are positively diagnostic of malaria if high and of absence of malaria if low.

iii. In this test a suspension of melanin takes the place of the previously used metharfer and albuminate of iron solutions. The melanin suspension is obtained as follows:—

(1) Use the eye of an ox. (2) Remove the lens. (3) Scrape the choroid and collect the gelatinous material, containing melanin. (4) Add to this magma twice its volume of distilled water and grind up thoroughly. (5) Add formal as preservative (1-200). (6) Filter through lightly packed glass wool. (7) Centrifuge the filtrate sterily for 8 minutes at 4 000 revolutions. (8) Keep the supernatant fluid in sterile tubes and in the ice chest. (9) Leave the suspension for a month to become stable before use.

W F Harvey

With reference to the summaries of HENRY and of LE BOUNDELLES & LIÉGEOIS in No 5 of this *Bulletin* (p 383) Dr Henry has objected to the statements that the quantities of the dilutions are unstated and that the two other authors failed to confirm his (Dr Henry's) findings. The position taken up by the two authors can be deduced from the summary of their later paper: the reviewer's statement was verbally correct, but perhaps its brevity laid it open to misunderstanding. Dr Henry makes the point that a serological reaction has not the precision of a chemical reaction. The summaries of his later papers will give a clear idea of his methods and their results.—Ed

LE BOUNDELLES (B) & LIÉGEOIS (R) Sur la séroflocculation du paludisme. Les conditions de la réaction: facteurs non spécifiques de sensibilisation et facteurs spécifiques. [*Sero-flocculation in Paludism. The Conditions of the Reaction: the Specific and Non-Specific Factors of Sensibilisation.*].—C.R.Soc. Biol. 1929 June 14 Vol. 101 No 20 pp 466-468. [4 refs.]

The authors carried out HENRY's flocculation test in 211 cases with a melanin antigen consisting of a fine suspension of ground-up choroid. During an attack of malaria, 84 per cent were positive. In chronic malaria with splenomegaly 65 per cent were positive. In non malarial controls, 6 per cent were positive. During the current year 103 sera have been examined with an antigen prepared by HENRY which was very rich in melanin. In acute malaria and in chronic cases with enlarged spleens the reaction was always positive but it was also positive in 25 per cent of the controls. The results were read after four hours. Fine flocculation tardy in appearance and limited to one tube was classed as negative. In definite cases of malaria the reaction was usually rapid, coarse-grained, and visible in the distilled water and the salt solution at the same time. It is pointed out that there are non-specific as well as specific factors concerned in the reaction, the factors due to dilution with distilled water to impurities in the antigen, and to colloids bearing different charges. The authors state that the reaction is one of time and degree.

W F

SARATUCCI (Mario) [Le reazioni di flocculazione nell'infezione malarica.] (*The Precipitation Tests in Malaria.*)—*Riv di Malariologia*. 1928. Nov.-Dec. Vol. 7 No. 6 pp. 853-865 [21 refs.] [English summary p. 817.] [Inst. of Clin. Med., Rome.]

The author applied the Sachs-Georgi Mehncke Kahn, Muller Signes, and Wassermann tests in 23 cases of malaria, and concludes that malaria may sometimes cause slight positive reactions. In ten malaria patients and ten controls he employed Henry's iron methylarsenate test with positive results in six of the malaria cases and one of the controls.

W F

PICADO (C) Nouvelle réaction sérologique pour le paludisme. (*A New Serological Reaction in Malaria.*)—*C R Soc Biol* 1929. Feb. 22. Vol. 100 No. 7 pp. 479-481 [San José Hosp. Costa Rica.]

The author examined 743 cases by the Hecht Weinberg modification of the Wassermann reaction employing the red cells of the rabbit in place of those of the sheep adding after one hour at 37° C., half the quantity of corpuscle-suspension which was capable of being lysed. At the same time he put up a parallel series of tests in which a sugar solution was substituted for the antigen of the Hecht test. This solution consisted of 10 per cent saccharose in distilled water with double the volume of 0.9 salt solution. He concludes that a definite positive reaction in the saccharose solution combined with a negative Hecht test indicates almost certainly the presence of uncured malaria. This positive reaction he states can be changed to negative by treatment with quinine or plasmoquin. He also states that if both the Hecht and the sugar test are positive it is necessary to give a test course of quinine (which would convert the sugar reaction to negative in the case of malaria) or a test course of novarsenobenzol (which would convert the Hecht test to negative in the case of syphilis). It is suggested that the reaction might be positive in kala azar and trypanosomiasis which the author has not had an opportunity of examining.

The figures which are given do not support these conclusions very clearly. It appears from them that syphilis as well as malaria, may produce a positive saccharose reaction and so also may intestinal parasites such as amoebae ankylostomes or ascarides. Consequently the reaction is not likely to be of practical use in the tropics.]

W F

PERI (Giuseppe) La reazione di Gaté e Papacostas nella malaria. (*The Formal-Gel Reaction in Malaria.*)—*Ann di Med Nat e Colon* 1929 Jan.-Feb Year 35. Vol. 1 No. 1-2. pp. 48-58. [39 refs.]

The formal-gel reaction was found positive in 95 per cent. of cases of malaria, so is of specific value it is claimed, if leprosy tuberculosis, syphilis, trypanosomiasis and kala azar can be excluded—rather a long list. It may be delayed for 48 hours and has no relationship to the intensity of infection.

C. L.

WAGNER JAUREGG (J) Einige Bemerkungen über die Impfmalaria.
 II Die Bedeutung der Blutgruppen für die Impfmalaria. [*The
 Significance of Blood Groups in Inoculated Malaria.*—*Wien Klin
 Woch* 1929 Jan. 3 Vol. 42 No 1 pp 1-2. [11 refs]
 [Summary appears also in *Bulletin of Hygiene*]

All writers have been struck by the fact that patients treated with malarial inoculation very frequently develop a quotidian type of fever which may be awkward in a number of cases because the patient's strength especially his heart may be taxed unduly having no time between attacks in which to recover. The method of inoculation does not affect the type of fever since a proportion of patients inoculated subcutaneously or intravenously with blood or by mosquitoes develop quotidian fever. It is particularly frequent in paralytics and least so in secondary syphilitics. The author after considering various possible explanations thinks that the patient's constitution is the determining factor. In the blood used for inoculation are plasmodia in all stages of development and in the receiver's blood they may come under the influence of forces which accelerate or retard their development, according to the case. WETHMER following on work by WINDLBERGER on the influence of blood groups in this matter found that what favoured most the development of quotidian fever was intravenous injection with blood not agglutinated by the receiver. This resulted in 46 per cent. pure quotidian and only 27 per cent. pure tertian after an incubation period averaging 4½ days. On the other hand, subcutaneous inoculation of a blood which was agglutinated by the receiver resulted in only 8 per cent. quotidian and 92 per cent. pure tertian after an incubation averaging 15½ days. A fever which precedes the paroxysms of classical type has been noted by various observers. It is remittent and reaches only about 102° F or perhaps a little higher but lasts continuously from a day or so to three or four days. This type of preliminary fever occurred in all the cases treated intravenously with non agglutinated blood and lasted an average of 3.7 days. It occurred in only 42 per cent. of the cases treated subcutaneously with blood of a group agglutinated by the receiver and lasted only an average of 1.2 days. The author thinks also that the greater frequency of the quotidian fever in paralytics is due to a peculiarity developed by the disease which favours the maturing of the plasmodia. [This may explain the cases in which quotidian fever follows inoculation by mosquitoes.] Thus by typing the receiver's and donor's blood one may determine to some extent the type of the fever arising naturally for the tertian type in the feeble patient.

L. W. Harrison.

HORN (Ludwig) Studie ueber die Malaria-parasiten im verträglichen und unverträglichen Serum. [*Research on the Malaria Parasite in Compatible and Incompatible Serums.*—*Wien Klin Woch* 1929 July 25 Vol. 42. No 30 pp 995-996 [7 refs]
 [Neurol. Psychiat. Clinic, Univ. Vienna]

On the suggestion of Professor WAGNER JAUREGG the study of the fate of the malarial parasite in compatible and incompatible serums was undertaken. A drop of blood containing the parasites was cautiously mixed with a drop of incompatible serum (different blood group) then films were prepared. A similar preparation with compatible serum

(similar blood group) was made. Also films of the malarial blood without serum were made for comparison. The blood was taken from the patient at the height of the malarial attack, at the decline, and at various stages in the interval. The investigations showed that the benign tertian parasite of inoculation malaria underwent definite changes in the incompatible serum. The changes were partly a shrinking and breaking up of parasites and partly the throwing out of processes by plasmodia which were no longer amoeboid. Other morphological changes were noted. No such changes were observed in the compatible serum. The observations are in agreement with clinical experience, because it is found that in an incompatible inoculation the incubation period lasts longer since a great number of the parasites have been killed or more or less injured. WAGNER JAUREGG considers the blood of cases of general paralysis offers particularly favourable conditions for the development of the plasmodium, and this explains the quotidian course of the malaria which is frequently observed after inoculation.

E. D. W. Greig.

MARGINESU (P) Contributo allo studio dell'infezione malarica sperimentale [Studies in Experimental Malaria.]—*Giorn. di Chir. Med.* 1929 June 30 Vol. 10 No. 9 pp. 575-578, 579-582, 585-587 [Hyg Inst Univ Parma.]

This is an interesting paper. For his experiments the author injected intravenously, amounts of 5 or 10 cc. of blood taken from a malarial subject during an attack of fever and noted the period of incubation, the forms of the parasite in the recipients' blood, and the duration of attacks when left untreated. Within a few hours there was a slight rise of temperature unaccompanied by rigors or sweating and due to the introduction of foreign protein. This usually lasted for 3-5 hours. The period of incubation before malarial attacks came on varied between one and twelve days. Of 18 subjects observed, 13 had an incubation of five days or less, only one as long as twelve days. This appeared to depend, not on the amount of blood injected, but was an individual peculiarity. 5 cc. were injected into each of four individuals, the whole 20 cc. being taken from a malarial subject at the same time. The periods of incubation were 1, 2, 3 and 7 days. In five patients in whom it was less than two days, the donor and recipient belonged to different blood groups; those showing a period of 7-12 days belonged to the same group. In the first febrile attacks the number of parasites found in the blood was very small; gametes were met with in most of the patients, sometimes early in the third access, at others at the sixth to eighth.

H. Harold Scott.

CIUCA (M), BALLIF (L.) & VIÉRU (M.) Etudes sur l'immunité dans le paludisme (Communication préliminaire) [Studies on Immunity in Malaria.]—*Arch. Roumaines Path. Expér. et Microbiol.* 1928. Dec. Vol. 1 No. 4 pp. 577-596. With 3 figs. [Hyg. Lab. Faculty of Med., Jassy & Hosp. for Mental Diseases, Socola.]

The authors conclude, as the result of 297 observations made during the therapeutic inoculation of persons suffering from diseases of the nervous system, that immunity to malaria is not uncommon in a country

like Romania where the disease is prevalent and some 900 000 persons are infected. From 0.5 to 10 cc. of fresh blood containing benign tertian parasites was inoculated subcutaneously intramuscularly, and intraspinally. If an inoculation proved unsuccessful it was repeated several times with the same or another strain of parasites but in only 54 per cent. was the result positive. A group of 33 persons who resisted a first inoculation all resisted a second with one exception. Another group of 15 who had resisted two inoculations, all resisted a third. Autopsies made in 8 immune cases revealed no chronic malarial infection to account for the immunity. It was found moreover that after an experimental infection had been cured, susceptible patients tended to become immune. For example only 7 out of 23 who were cured of a first infection succumbed to a second inoculation and all of these 7 were immune to a third. Second inoculations in several cases were followed by the appearance of parasites without symptoms showing that partial immunity had been produced by the first attack: third inoculations were negative in such cases. Resistance to first inoculations of quartan malaria occurred less commonly (25 per cent.) than resistance to benign tertian and this the authors attribute to the comparative rarity of the quartan form in Romania. The incubation in 23 persons following quartan inoculation was from 20 to 60 days and almost always more than 30. Persons resistant to benign tertian were found to possess a slightly increased resistance to quartan but there was no real cross-immunity between the strains. Twenty five persons who were resistant to tertian or quartan malaria were inoculated with 4 cc. of blood containing subtertian parasites with the result that 75 per cent. became infected after an incubation period of 5 to 30 days showing that immunity to benign tertian or quartan malaria did not protect against the subtertian form.

[The immunity is probably to one strain of benign tertian, but it is not quite clear from the text whether this is the case or not.]

W F

MANSON BAHR (Philip) A Case of Resistance to Benign Tertian Malaria Infection.—*Trans Roy Soc Trop Med & Hyg* 1929 Mar 9 Vol. 22. No 5 pp 469-470 [3 refs]

On a man of 46 who had lived most of his life in India and who had a Wassermann reaction strongly positive in serum less so in cerebrospinal fluid, infected anopheles from Col. S. P. JAMES's stud were fed. No infection could be induced either thus or by subcutaneous and intravenous injections of malaria blood even with the aid of protein shock.

C. L.

FISCHER (Otto) Zur Frage der natürlichen Uebertragbarkeit der Impfmalaria. (Beobachtungen am Wiener Stamm. [The Natural Transmission of Inoculation Malaria].—*Dermat W'och* 1928. Sept 15 Vol. 87 No 37 pp 1292-1297 [12 refs] [Inst for Ship & Trop Diseases Hamburg]

Blood with the Vienna strain of *P. vivax* which is said to be gameteless and to exclude the possibility of risk of infection by mosquitoes was sent to Hamburg. On arrival it contained bodies

with every appearance of gametocytes both male and female. When injected into men it regularly produced gametocytes, and when anopheles were fed on these men the insects became infected.

C. L.

SERGEANT (Edmond) & SERGEANT (Etienne) *Vingt-cinq années d'étude et de prophylaxie du paludisme en Algérie* [A 25 Years Study and Prophylaxis of Malaria in Algeria.]—*Arch Inst Pasteur d'Alger*. 1928. June-Sept. Vol. 6. No. 2-3 pp. 117-434 With 148 figs.

The brothers Sergeant have brought together in one issue of the *Archives de l'Institut Pasteur d'Algérie* notes of 25 years antimalaria work. Although the title of the volume refers only to Algeria, mention is made of similar French work in France Morocco, Corsica and elsewhere. All the ordinary antimalarial measures are mentioned uncritically and some of them are excellently illustrated.

There is a long *Bibliographie analytique* made up apparently of the Sergents own work only. The section of this dealing with blood examination has very little direct connexion with human malaria, concerning itself mainly with haemogregarines, trypanosomes and bird malaria.

As will be gathered from the above the book contains little that is new

J. F. C. H.

PEREKROPFF (G. J.) Ein Fall von einhalttender Wirkung der frischen Infektion mit Syphilis-Sprosschen auf die klassischen Anfälle im Verlauf der Malaria tertiana. [Inhibiting Effect of Fresh Infection with Syphilis on Benign Tertian Malaria.]—*Arch f Schiffs u. Trop Hyg* 1929 Aug. Vol. 33 No. 8. pp. 432-439 [7 refs.]

The author's opinion, based on three cases which he describes, is that the favourable results obtained in the treatment of general paralysis with malaria must be ascribed not solely to the malarial parasite but also to the combined therapy with salvarsan and quinine although quinine alone cannot cure syphilis.

E. D. W. Greig

ROBBINS (F. C.) Rupture of Spleen during Anti-syphilitic Malarial Treatment.—*U.S. Veterans Bureau Med Bull* 1929 Apr. Vol. 5 No. 4 pp. 291-294 [U.S. Veterans Hosp., Perry Point, Md.]

A man given an intravenous inoculation of malaria "for tabes dorsalis" had his first rigor on the seventh day—these continued daily but that on the thirteenth day was followed by acute abdominal pain. He died twenty-four hours later with the peritoneal cavity full of blood which came from a rupture an inch-and-a-half long at the lower pole of the spleen.

C. L.

ZIMMANN (Hans) Technik der Malariaimpfung bei Paralyse Tabes multiplex Sclerose [Technique of Inoculation Malaria.]—Reprinted from *Med Woch* 1928 No. 21 & 23 13 pp.

The object of this paper is to present the subject in a form suitable for medical practitioners. The author considers that, whilst the value of inoculation and its results have been fully dealt with, the technique has been somewhat neglected. Consequently in this communication only inoculation is discussed. He is of opinion that inoculation of malaria has been an immense boon to humanity.

E. D. W. Greig

CLAUDE Sur la création de centres de malaria thérapie [The Inauguration of Centres for Treatment by Malaria.]—*Bull Acad Méd* 1929 Apr 23 83rd Year 3rd Ser Vol 101 No 15 pp 501-503

M Claude suggested that owing to the difficulties experienced by medical men in many parts of France who wish to have patients, suffering from syphilitic diseases of the central nervous system treated by the inoculation of benign tertian malaria, centres for such treatment should be established in various districts throughout the country. He considers that these centres should not be in lunatic asylums or if they must be so they should form a separate voluntary section. On the proposal of the President of the Academy M CLAUDE's suggestion was referred to a Commission consisting of MBL CLAUDE MARIE, SOUGUES MARCROUX and BRUMPT.

W F

CARTON Recherches sur l'index endémique paludéen à Dschang et à N'kongsamba (Cameroun) en février et mars 1928 [Endemic Malarial Index in Cameroons, February and March, 1928.]—*Ann de Méd et de Pharm Colon* 1928 Oct.-Nov.-Dec. Vol 26 No 4 pp 435-449

Infection is predominantly with *P falciparum* next with *P vivax* rarely with *P malariae*. The paper is mainly of local interest only. The microfilaria rate at 10 to 15 years of age was 60.8 per cent. of 46 examined. *Mf persians* was four times as frequent as *Mf loa*.

C L.

ROSS (P) Some Observations on Malaria and Helminthiasis in the Central Kavirondo Reserve adjoining Kisumu.—*Kenya & East African Med J* 1929 Feb Vol. 5 No 11 pp 367-374

At 3800 to 5000 feet altitude malaria is prevalent, particularly the subtertian form. Judged by a single faecal smear ascariis and taenia are common, the hookworms less so with trichuris strongyloides and both schistosomes also present.

C. L.

CARTER (Henry F) & JACOBS (W P) Observations on the Transmission of Malaria by Anopheline Mosquitoes in Ceylon.—*Ceylon J Sci* (Sect. D Med. Sci.) 1929 Feb 13 Vol. 2 Pt. 2. pp 67-88 With 4 text figs 5 plates & 2 maps. [4 refs.]

A culicifacies was the only mosquito found infected, and that to the extent of 81 of 1639 examined. The spleen rate in places was as high as 100.

C. L.

SCHNEIDER (Johannes) Organisation und Erfolg der Malariaabkämpfung in Palästina. [Antimalarial Measures in Palestine.]—*Cent f Bakt I Abt. Orig* 1929 Feb 16 Vol. 111 No 1/3 pp 99-124 With 1 text fig [20 refs.]

The writer notes the large amount of antimalarial work accomplished in Palestine from 1921 to 1926 with an accompanying fall in malarial incidence features well known to readers of this *Bulletin* and illustrated, to take a random example by the fall in the spleen rate in Jerusalem from 44.4 in 1918-19 to 0.8 in November 1928.

C. L.

ERESTANI (R.) [Zwei Fälle der traumatischen Läsion der Milzhinde.] [Two Cases of Traumatic Rupture of Malarial Spleen.]—*Neurichia d. Tropischen Medizin* Tiflis. 1928. Nov. Vol. 1 No. 1. [In Georgian script. German summary p. 113.]

Two cases of traumatic rupture of malarial spleens without visible external injury are described—both recovering after splenectomy. One suffered from tertian, the other from quartan malaria. The latter on the third day after operation had a malarial attack with plasmodia in the blood.

C. L.

BLANCHARD (M.) & PIN (AL.) Rechute de paludisme six ans après le départ de pays d'endémie [Malarial Relapse 6 Years after leaving Country of Infection.]—*Bull Soc Path Exot* 1929 Feb. 13. Vol. 22. No. 1 pp. 73-75.

In 1920 the man concerned contracted malaria microscopically established in Uganda. His subsequent travels were England 1922, New York 1925, England 1928, France 1928. Here he had a simultaneous bilateral pneumothorax produced for pulmonary tuberculosis and in December began to get high fever and it was found that 70 per cent. of red corpuscles contained *P. malariae*.

C. L.

CARONI (R.) Contributo al ricambio della creatinina. La creatinina urinaria nella malaria. [Urinary Creatinin in Malaria.]—*Policlinico Sez. Prat.* 1929 Mar. 25 Vol. 36 No. 12 pp. 403-407 With 3 charts in text. [Inst. of Clin. Med., Univ., Rome.]

The writer's work leads to the conclusion that in malaria urinary creatinin is always increased. Its origin is at present uncertain, but animal experiment shows that there is relative and actual increase of creatinin in splenectomized animals.

C. L.

GIAUXI (Gino) La dilatazione dell'aorta nella infezione malarica. Interpretazione patogenica e osservazione di alcuni casi. [The Dilatation of the Aorta in Malaria.]—*Riv. di Malarologia* 1929 Mar-Apr Vol. 8. No. 2 pp. 149-171 [22 refs.] [English summary p. 155.]

The author describes three cases of dilatation of the first part of the aorta in malaria. He states that this is not due to aortitis, but represents a protective effort for the maintenance of circulatory compensation, and occurs under the influence of the sympathetic nervous system.

W. F.

OTTOLENGHI (D.) & BROTEU (G.) Intorno all'eventuale azione di pasti eterologhi sullo sviluppo del parassita malarico nell'anofele. [On the Effect of Heterologous Meals upon the Development of the Malarious Parasites in Anopheles.]—*Riv. di Malarologia* 1929 Nov-Dec Vol. 7 No. 6 pp. 849-852. [7 refs.] [English summary p. 917.] [Hyg. Inst. Univ. Bologna.]

The authors' experiments show that malarial infections in anopheles follow a normal course, no matter what animals the mosquitoes feed upon after being infected (cow, ass, sheep, guinea-pig, rabbit or pig).

W. F.

LEGENBRE (A.) MONDAIN (A.) & RAZAFINDRAMAMBA L'action du quino-stovarsol sur le *P. vivax* chez les indigènes des hauts-plateaux de Madagascar [Action of Quinine Stovarsol on *P. vivax* in Natives of Madagascar]—*Bull Soc Path Exot* 1929 Feb 13 Vol. 22. No. 2. pp 137-140

Seven cases are cited. Quinine stovarsol rapidly removed schizonts and less rapidly gametes of *P. vivax* from the skin blood

C. L.

SERPULCHI (Piero) & VIDALE (Enrico) Autoemoterapia della malaria (Autohemotherapy in Malaria).—*Riv di Malarologia* 1929 Jan.-Feb Vol. 8 No. 1 pp 78-80 [English summary p 110]

The authors claim good results from antobaemotherapy in three cases of chronic malaria. They employed intramuscular injections of 10 cc. at different intervals, 9 to 16 times

W F

ALONSO ALONSO (Luis) & GONZÁLEZ AZCÚN (Federico) Campaña antipalúdica. Instrucciones, planes, órdenes, desarrollo enseñanzas y deducciones clínicas.—*Medicina Paises Calidos* Madrid. 1929 May Vol. 2. No. 3 pp 251-284

ANTONELLI (Giovanni) Nuovo contributo alla plasmochinoterapia dell'infezione malarica.—*Riv di Malarologia*. 1929 May-June Vol. 8. No. 3 pp. 262-302. [24 refs.] [English summary p 354] ["St. Spirito" Hosp., Rome.]

DAVIS (Nelson C.) & RICKARD (E. R.) Plan de lucha contra la malaria urbana en el norte argentino.—*Semana Méd.* 1929 Mar 14 Vol. 36 No 11 (1935) pp. 652-658 With 1 chart in text. [8 refs.]

DÍAZ FLORES (A.) Estudio hematológico de un caso de paludismo tratado con plasmochina.—*Medicina Paises Calidos* Madrid. 1929 Mar Vol. 2 No. 2. p 138

DJAPARIDZE (P.) [Die Schule und ihre Rolle im Kampf gegen Malaria]—*Nachrichten d. Tropischen Medizin* Tiflis 1929 Jan. Vol. 2 No 1 [In Georgian script. German summary p 72.]

FLANDIN (Ch.) MARCHEL (Georges) & LAPOLOIS (L.) Trois cas de paludisme ancien réveillés par la grippe.—*Bull et Mém Soc Méd Hôpiti de Paris* 1929 May 20 Year 45 3rd Ser No. 16 pp. 627-631 With 1 chart in text. [1 ref.]

FORBES. Probable Case of Congenital Malaria in Child Two Days Old.—*Kenya & East African Med J* 1929 June Vol. 6. No. 3 pp 80-82 With 2 graphs.

GAROFALI (Filiberto) Infezione malarica ed insufficienza epato-renale. (Le perniciose della Scuola romana.—Le complicazioni degli autori francesi).—*Riforma Med.* 1929 Apr 13 Vol. 45 No. 15 pp 510-511

GENOVESE (Francesco) Le condizioni di malaricità nell'Italia Meridionale.—*Malarologia* 1929 July 15 pp. 80-83

GREEN (Richard) The Relative Incidence of Albuminuria among Cases of Benign Tertian Sub-Tertian and Quartan Malaria.—*Malayan Med J* 1929 June Vol 4 No 2 pp. 63-65 [14 refs.]

IRVING (G M.) A Review of Malaria during 1928 in a Minor Hill Station in the Punjab.—*Indian Med Gaz* 1929 June Vol. 64 No. 6 pp. 307-312.

JENSEN (Vilh.) Itallens Kamp mod Malaria. Indtryk fra en Rejse i Efteraaret 1928.—*Hospitaltidende* 1929 May 2 Vol. 72 No 18. pp. 481-488.

KALMIKOFF (E. S.) [Exai d'une campagne antipaludique dans les écoles à Oréchovo-Zonévo]—*Russian J Trop Med* 1929 Vol. 7 No 1 pp. 12-17 [In Russian]

KANDILAKI (S.) [Zur Differentialdiagnose zwischen Malaria und anderen in Georgien verbreiteten Tropenkrankheiten].—*Nachrichten d. Tropischen Medizin* Tiflis. 1928 Nov Vol. 1 No. 1 [In Georgian script. German summary p 110]

KANDILAKI (Sim) OKROPIDZE (B) & ABULADZE (Sol.) [Einige Streitfragen in der Malariabehandlung und Plasmochin.]—*Nachrichten d. Tropischen Medizin* Tiflis. 1928. Dec Vol. 1 No 2. [In Georgian script. German summary pp 223-225]

- KOIKE (Totaro) [Hämato-logisch-parasitologische Studien ueber Impfmalaria bei Lowikern, mit besonderer Berücksichtigung der Zahlenverhältnisse beider Plasmodien].—*Japen. Jl. Dermat. & Urol.* 1928. Nov. Vol. 23. No. 11 pp. 1063-1061. With 3 charts in text. [23 refs.] [In Japanese. German summary pp. 79-81.] [Skin Clinic, Univ. Okayama, Japan.]
- KURDIANI (S.) [Wald und Malaria].—*Nachrichten d. Tropischen Medizin* Tiflis. 1929. Feb. Vol. 2. No. 2. [In Georgian script. German summary p. 178.]
- LAKSHADIE (V.) Note sur le paludisme à Pondichéry.—*Rev. Méd. et Hyg. Trop.* 1929. Jan.-Feb. Vol. 21. No. 1 pp. 19-21.
- LAMBERT (Robert A.) & DE OLIVEIRA (Antonio Bernardes). Pathological Studies in Malaria. I. Notes on 192 Rowth's Autopsies performed in São Paulo Brazil, with Special Reference to Pigmentation and Splenic Size.—*Porto Rico Rev. of Public Health & Trop. Med.* 1929. Jan. Vol. 4. No. 7 pp. 299-307.
- LEE (C. U.) Some Notes on the Treatment and Diagnosis of Malaria.—*Kai Med. Jl. China.* 1929. Feb. Vol. 15. No. 1 pp. 38-43. [3 refs.] [Peking Union Med. College, Peking.]
- MARÉCHAL (Henry) Traitement de quelques affections de l'estomac chez les paludéens, les tuberculeux et les vieillards par le suc gastrique saturé de chélen.—*Bull. Acad. Méd.* 1929. June 23. Year 92. Vol. 101. 2e Ser. No. 24. p. 804.
- MEKHEMARISCHWILI (L.) [Ueber den Stand der Meflorationsfrage in Georgia].—*Nachrichten d. Tropischen Medizin* Tiflis. 1928. Vol. 1. No. 1. [In Georgian script. German summary p. 111.]
- MIKAWA (Tadahiko) NOMURA (Gonichi) & HARADA (Naomoto). On the Electrocardiogram of Patients inoculated with Malaria.—*Acta Scholae Med. Univ. Imperialis in Kioto* 1929. Vol. 11. No. 2. pp. 391-401. With 2 text figs. & 1 plate. [3 refs.] [III. Med. Clinic, Imperial Univ. Kioto.]
- MINEROLI (A.) & SENSICALCHI (R.) Sulle modificazioni morfologiche e biologiche dei parassiti malarici nel trapianti interanimi.—*Riv. di Malariologia* 1929. May-June. Vol. 8. No. 3. pp. 251-259. With 1 colored plate & 2 graphs. [9 refs.] [English summary p. 353.]
- MITCHELL (W.) [Antimalarische Tätigkeit in Batum im Sommer 1928].—*Nachrichten d. Tropischen Medizin* Tiflis. 1928. Dec. Vol. 1. No. 2. [In Georgian script. German summary pp. 223-225.]
- DI PACE (Ignazio) Per la buona profilassi antimalarica.—*Malariologia* 1929. July 15. pp. 86-89.
- PATERNI (Ludovico) Sulla velocità di sedimentazione del globuli rossi nella malaria.—*Riv. di Malariologia* 1928. Sept.-Oct. Vol. 7. No. 5 pp. 690-712. [18 refs.] [English summary p. 845.]
- PATERNI (Ludovico) Le nefropatie nella malaria. (Nephropathies in Malaria).—*Riv. di Malariologia* 1929. Jan.-Feb. Vol. 8. No. 1 pp. 28-77. With 4 text figs. [18 refs.] [English summary pp. 109-110.] [Inst. Anatom. Path. Univ. Roma.]
- PERA CHAVARRIA (A.) La plasmoguina en el tratamiento de la malaria (Su inmensa importancia sanitaria).—*Gas. Méd. de Caracas.* 1929. Jan. 21. Vol. 36. No. 2. pp. 25-29. [9 refs.]
- PREYER (A. S.) [L'endémie paludique au sud de la Grande et les étapes de la lutte entreprenue].—*Russian Jl. Trop. Med.* 1929. Vol. 7. No. 1 pp. 18-24. With 5 text figs. [In Russian.]
- PROTAKIS (B. A.) Ueber die pathologisch-anatomische Diagnose der Nervensystemveränderungen bei Malaria.—*Arch. f. Schiff- u. Trop. Hyg.* 1929. May. Vol. 33. No. 5 pp. 267-269. [4 refs.] [Municipal Clinic, Univ. Athens.]
- PRICELLI (Luigi) La potassiemia nella malaria.—*Riv. di Malariologia* 1929. May-June. Vol. 8. No. 3. pp. 310-314. [11 refs.] [English summary p. 354.]
- DI PRIMO (R.) O Impaludismo autochtono do Estado do Rio Grande do Sul.—*Scientia Méd.* 1929. Mar. Vol. 7. No. 3. pp. 115-117.
- DI PRIMO (R.) O Impaludismo autochtono do Estado do Rio Grande do Sul.—*Brasil-Médico* 1929. Mar. 9. Vol. 43. No. 10. pp. 237-238.
- RICKARD (E. R.) QUINTE (P. Díaz) & NÚÑEZ (Alberto) Investigaciones sobre la afección de la malaria como barrida ventajosa y de baj. precio de los productos de desecho de la mollienda de la caña de azúcar.—*Scientia Méd.* 1929. Jan. 17. Vol. 36. No. 3 (1827) pp. 174-176. Also in *Bol. Inst. Químico* Buenos Aires. 1928. Vol. 4. Nos. 28-31. pp. 183-190.
- ROSENFELD (F.) Erfahrungen aus der Praxis mit Plasmochin aus Béhague (Bajagos-Inseln, Portug. Guinea).—*Arch. f. Schiff- u. Trop. Hyg.* 1929. Apr. Vol. 33. No. 4. pp. 223-225.

- ROSSI (Giacomo) La bonifica integrale della tenuta di Maccarese.—*Malariaologia*. 1929 July 15 pp 83-86
- RUCHADZE (N) [Ueber die Rolle der Haustiere in der Malariaepidemiologie].—*Nachrichten d Tropischen Medizin*. Tiflis. 1929 Feb Vol. 2. No. 2. [In Georgian script. German summary pp 178-179]
- RUCHADZE (N) [Ueber die jetzige Malariaepidemiologie].—*Nachrichten d Tropischen Medizin*. Tiflis. 1928 Dec. Vol. 1 No 2 [In Georgian script. German summary p 222]
- SCHILLING (Claus) Zur Epidemiologie der Malaria.—*Ztschr f Hyg u Infektionskr* 1929 Feb. 17 Vol. 110 No 1 pp 120-125 With 8 charts in text. [1 ref.] (Robert Koch Inst. Berlin.)
- SERAFSCHWILI (A.) [Ueber den Bevölkerungszuwachs in einigen Malariainfizierten Dörfern Kachetien].—*Nachrichten d Tropischen Medizin*. Tiflis. 1929 Jan. Vol. 2 No 1 [In Georgian script. German summary pp 69-70]
- SETTE (N) Transformation in vitro d anneaux de *Plasmodium prasco* en corps en croissant et en sporozoites.—*Bol Serione Ital Soc Internaz di Microbiologia* 1929 May Vol 1 No. 5 pp 112-114 [Ancon Hosp Ancon]
- SIMMONS (James S) & ST JOHN (Joe H.) The Prevalence and Distribution of Malaria on the Island of Corregidor Philippine Islands. Report of a Survey made July 1928.—*Philipp Surgeon* 1929 May Vol. 64 No. 5 pp 710-733 With 1 chart & 1 fig [6 refs.] [U.S Army Med. Dept. Research Board, Bureau of Science Manila Philippine Islands]
- SPEEDY (W D) Notes for Staff engaged on Anti malarial Work.—*Indian Med Gaz* 1929 May Vol. 64 No 5 pp 249-251
- THAKKAR (K. V) Plasmoquin in Pregnancy.—*Indian Med Gaz* 1929 Apr Vol. 64 No 4 p 196
- VALLI (Vittorio) Campagna antimalarica nelle Venexie Relazione tecnica per il 1928.—*Riv di Malariaologia*. 1929 May-June. Vol. 8. No 3 pp 237-250 With 3 text figs. [English summary p 353]
- VAN DEN BRANDEN (F) & HENRY (E.) Le paludisme chez les enfants indigènes à Leopoldville.—*Ann Soc Belge de Méd Trop* 1929 Mar 31 Vol. 9 No. 1 pp 37-43
- WIESSALADZE (Sp) [Die Bekämpfung der Malaria und anderer tropischen Krankheiten in Georgien].—*Nachrichten d Tropischen Medizin*. Tiflis. 1928 Nov Vol. 1 No 1 [In Georgian script. German summary pp 109-110]
- YOUNG (T C. McCombie) & MAJID (Abdul) Further Observations on Malaria in Coorg.—*Indian J Med Res* 1929 Jan. Vol. 16 No. 3 pp 766-769 [1 ref.]
- ZIEHMANN (Hans) Neuere Uebersicht ueber die Beziehungen von Malaria und Impfmalaria zur Neurolues.—*Med Klin* 1929 Jan. 18 Vol. 25 No 3 (1258) pp 116-118 [9 refs.] [Path. Museum Univ Berlin]

REVIEWS AND NOTICES.

HOFFMANN (W. H.) Das gelbe Fieber. [Yellow Fever]—Kollé & Wassermann's *Handbuch der Pathogenen Mikroorganismen* 1929. Vol. 8 Lief. 32. pp. 419-500 With 7 text figs. & 2 coloured plates.

The last two years have seen such important advances in our knowledge of yellow fever especially on the experimental side, that this new edition of the article on yellow fever appears at a very opportune moment, and the author has been careful to incorporate most of the recent work on the subject up to the end of 1928.

Concerning the history of yellow fever the author inclines to the view that it was originally a West African disease and was carried to the West Indies during the Spanish slave trade of the seventeenth century a view which is supported by the general history of the disease. The section on the etiology of the disease includes references to Noguch's voluminous publications indicating *Leptospira icteroides* as the causative agent. As the author remarks, it is very difficult to explain these results, especially those dealing with the serological tests but Hoffmann believes that some of the guinea-pigs used in these experiments had latent infections of Weil's disease. In support of this view he mentions that one of his experimental animals developed a typical fatal attack of Weil's disease without having been inoculated. The description of the clinical symptoms is followed by a good account of the pathology of the disease and the histological changes are very well illustrated by a coloured plate in addition to 2 text figures.

It is rather surprising that the section on immunity should contain no reference to the work of the French Commission, composed of Macleod, Salimbeni and Smoed in view of their important experiments on the protective value of immune serum.

The method of transmission is discussed in detail, and is followed by a discussion of the epidemiology of the disease. The opening sentence of this section indicating that transmission is effected solely by the bite of *Aedes aegypti* is a good example of the difficulties of keeping up-to-date on a subject of this nature for whilst the article was in the Press other species of mosquitoes have been shown capable of transmitting yellow fever. Again, no reference is made to Macleod and Smoed's observations, especially their experiment recording the hereditary transmission of yellow fever to the offspring of infected mosquitoes. Although recent experiments on this question at Lagos have given negative results, it is a little premature to assume that such hereditary transmission never occurs, as it may require special conditions.

The article concludes with a summary of methods of combating the disease and the dramatic results of anti-mosquito campaigns in Central and South America are strikingly illustrated in a chart giving the distribution of yellow fever in 1900 1919 1921 and 1925, respectively. In West Africa additional methods are required, and the author mentions the necessity for some means of vaccination. The work of the British Yellow Fever Commission in West Africa is not once referred to not even in the section dealing with the epidemiology of the disease, nor in the account of the bionomics of *Aedes aegypti*. Possibly the fact that the reports of this Commission appeared during the earlier years of the war is to some extent responsible for the way in which their results have often been overlooked. It is difficult however for an author to compress a subject of this nature into 80 pages without some omissions, and the article as a whole is a good accurate account of our knowledge of yellow fever up to the date of publication.

E. Hindle

ROGERS (Leonard) [C.I.E. M.D. B.S. (Lond.) F.R.C.P. F.R.C.S. F.R.S. Major-General Indian Medical Service Ret. Medical Adviser to the India Office] **Recent Advances in Tropical Medicine.** 2nd Edition.—pp x+439 With 16 text figs. 1929 London J & A Churchill 40 Gloucester Place Portman Square [12s 6d.]

Demand for this book has necessitated a second edition in little over a year's lapse from the appearance of the first. The volume has been revised throughout, without sacrificing those historical parts which lent so much interest to various sections in the first edition for the most recent of advances however valuable, is best appreciated in relation to the indispensable work of the pioneers in that subject. The author himself has fruitfully pioneered. His distinguished original contributions to the modern science of tropical medicine fully ensured the interest of all workers in that branch of medicine in a volume wherein would be set out his selection of what was recent and advance. That interest was not disappointed and it is clear that very many of his fellow workers have found this book useful also. In spite of here and there obvious signs of carelessness in proof reading both interest and usefulness are enhanced in this second edition. In it the author has given us new sections on Oroya Fever Verruga Peruana Granuloma Inguinale Climatic Bubo and additional Helminthic infections. There are also some new illustrations. The best compliment to this book will be paid by the readers—who will surely expect and look out for in due course of time a third edition.

H M Hanschell.

DAUKES (S H.) [O.B.E. M.D. D.P.H. D.T.M. & H. Director of the Wellcome Museum of Medical Science affiliated to the Bureau of Scientific Research] **The Medical Museum. Modern Developments, Organisation and Technical Methods based on a New System of Visual Teaching. An Amplification of a Thesis read for the Degree of M.D. Cambridge.**—172 pp With frontispiece & 44 figs. The Wellcome Foundation Ltd. Endsleigh Court 33 Gordon Street London W.C. 1

Dr Dankes has made the subject of museum teaching so peculiarly his own, that a monograph from his pen automatically assumes authoritative status.

His volume covers the whole field of the teaching of medicine by visual demonstration, a system so diversely and admirably illustrated in the Wellcome Museum of Medical Science. Particularly valuable is the advice regarding the types of building, the equipment and staff required, together with a wealth of information on the methods of mounting and preserving museum specimens, which practical experience has shown to be best. To this technical matter is appended a comprehensive bibliography amplified in many instances by summaries of the originals.

The author's defence of the graphic and synoptical method of teaching seems unnecessary for anyone sceptical of its utility would speedily be converted by a visit to a museum organized on the lines advocated by Dr Dankes, like Goldsmith's intending scoffers who remained to pray.

Finally the work is rounded off by a large series of excellent photographs chosen so as to point the morals embodied in the text.

The Medical Museum will prove an invaluable book of reference. Furthermore it will bring home to many readers the manifold advantages of the visual method of instruction, whether their interests are those of the teacher the medical undergraduate or the student of a larger growth.

W P MacArthur

ROCKEFELLER FOUNDATION *A Review for 1928* [VINCENT (George E.) President]—54 pp With 28 figs. & 4 maps. 1929 New York.

This is a particularly interesting report, since it gives us not merely an account of the doings of the year 1928, but also a review of the sixteen antecedent years and a prospectus of more varied and more extensive activities perpending under a new and more comprehensive order.

To take first the year 1928. That year the Foundation disbursed the immense sum of 21,890 738 dollars—about 4½ million pounds sterling—of which a little more than 3 million dollars come under the heading of Public Health, more than 17 million under Medical Education, and the balance under miscellaneous headings which include various auxiliary sciences, and instruction in nursing. In the map of the World, upon which the distribution of this expenditure is imprinted, Europe, Southern and Eastern Asia, and the Americas from Canada to the Argentine are deeply scored, Africa is a blank except for two spots in the west, where research on yellow fever is in progress, and Australia also is blank except for two points in the south signifying biological researches and the grant of fellowships.

Of the money spent on Public Health, 2 million dollars went collectively on control of hookworm and malaria in many countries and of yellow fever in Brazil, on organized rural sanitation in the United States and other forms of service in many foreign countries, on emergency measures in the Mississippi flood districts, and on the public health organization of the League of Nations—and about one million went to Public Health Education—under which heading are included building, equipment, endowment, or upkeep variously of schools and institutes of Hygiene in Harvard, Toronto, Brazil, Trinidad, London, Czechoslovakia, Hungary, Yugoslavia, and Fiji, and also a multitude of fellowships and other educational devices in public health.

Of the expenditure on Medical Education, the sum of 12 million dollars was taken from principal for the endowment (under certain conditions) of the Peking Union Medical College for which institution, it will be remembered (see this *Bulletin* Vol. 18, pp 146, 147) the Foundation provided lands, buildings, and equipment, and has hitherto paid the upkeep, the present magnificent endowment being intended to clear the way for a final triumphant vision of the College as a through and through native institution. Other large sums have gone severally to the University of Brussels, the New York Academy of Medicine, the Sao Paulo Faculty of Medicine, and the University of Lyons, and smaller but substantial sums to medical institutions in Canada, Haiti, Cambridge, Edinburgh, Strasburg, Munich and other places in central Europe, Beirut, Siam, China, and Japan. Medical Fellowships—as distinct from those for public health—amount for nearly 300 thousand dollars, and schools for the preliminary scientific studies for nearly 70 thousand.

Such are the bare figures for the year 1928. To give imagination further play we must think of them as a yearly recurring item in a "Record of Sixteen Years" here separately presented as prelude of a new stage in the evolution of the Rockefeller Foundation.

Apart from the distraction of the Great War (to aiding the medical needs and relieving the distress of which it devoted more than 22 million dollars) the efforts of the Foundation during these sixteen years have been concentrated on improving existing standards of public health all the world over. In this fine purpose fundamental stress has been laid on education, conceived so broadly as to include not only the health officer but also the medical man—both undergraduate and graduate—the biologist, and the nurse. Besides the very completely equipped Union Medical College in Peking, the Foundation has in numerous towns in America, Europe and Asia, established or expanded schools and institutes of public health, and has strengthened, in respect of departmental buildings,

laboratories, equipment, and professorships numerous influential medical schools where research can be conducted in happy association with great hospitals in several places it has founded or liberally assisted "pre-medical" schools where the biological sciences are independently studied, and training schools for nurses. Fellowships and scholarships also in a comprehensive range and in liberal freedom of study have been instituted on a great scale. In the sixteen years of its existence 3 187 of these fellowships have been granted to representatives of 58 countries, at a cost of nearly 5 million dollars, and 1 383 of the fellows have pursued their studies in countries other than their own. Furthermore by visiting-commissions, surveys and other such means the Foundation has promoted the training of health-officers in field work and has accumulated valuable experience and by pecuniary assistance to various useful publications it has generally facilitated study and research.

Of the Foundation's large schemes for the control of endemic disease the unending cosmopolitan hookworm campaign is well known. Its results have been chastening for the speedy optimist, but instructive for the Fabian: they have at least shown clearly how man may rid himself of the hookworm if—in the words of Portia—to do were as easy as to know how to do. In its practical effect it has given temporary relief in many places and has left in its wake—particularly in the United States—a multitude of rural health organizations which are described as "modest but complete"—and at any rate may be taken as well informed. The widespread antianopheles antimalaria operations and experiments to which the Foundation contributes both means and prestige will probably have similar results: undoubtedly they will be instructive and may awaken the thing known by the awful name of "sanitary conscience" in its sleeping-places, and "in suitable places" the methods favoured by the experts of the Foundation may give temporary relief: but one is inclined to think that one careful study of the history and the present conditions of some rural area where malaria has spontaneously disappeared without any dispossession of well-known malaria-carrying *Anopheles* or any destruction of their breeding places would be more informative than many studies of larvicides. Of the steadily-pressed offensive against the yellow fever mosquito the immediate and direct result may be described as spectacular. He would indeed be a curmudgeon who failed of applause: and yet there is something to learn from the recent tricky reappearance of the disease in Brazil. The last of the noteworthy items singled out in the "Record" is the anti-tuberculous organization built up by the Foundation in France during the War: this has been taken over by the French and incorporated in their Public Health Service.

From first to last the Foundation has spent on the undertakings here pictured in a flash-light the sum of 144 189 000 dollars.

The *Record* just noticed is prologue to a larger drama where the Rockefeller Foundation, as hitherto known, appears in union with the Laura Spelman Rockefeller Memorial as a new corporation under the old name with increased resources. To the activities of the new Rockefeller Foundation will now be added the advancement of knowledge in social science and in the humanities. Its public health departments are to be administered by an International Health Board with seven directors and the several subservient departments—the natural sciences, medical science, social science and the humanities—each independently by a director. To the reviewer it has always seemed one of the distinctively excellent features of the Rockefeller Foundation as a philanthropic institution that in its "pre-medical" schools and in its grants-in-aid and fellowships for studies ancillary to Hygiene it early recognized the fundamental and perennial value of biology: since in biology the sciences that make for the improvement of the physical environment of the wonderful piece of work Man as "the paragon of animals" have their living roots (as distinct from their outward appurtenance and service). But within the physical conditions, amenable to skilled control, there is—far more intractable

Obviously however the use of standard treatments is only a practical method when dealing with a disease which has an easily recognised symptom-complex, in which a diagnosis can readily be made by recognising the causal organism or by some chemico-physical test, and for which there is a specific remedy. These factors as pointed out by Dr Leitch, are found in many tropical diseases. The second point which almost necessitates treatments being standardized when dealing with diseases among native populations, is their large numbers and the circumstances under which treatment has to be given. Malaria, kala azar relapsing fever yaws syphilis the dysenteries, cholera and helminthic infections have all been the subject of standard treatments, though the methods have varied considerably.

Dr Leitch, called upon to treat large numbers of coolies on tea plantations, set out to test various standard treatments in some of the diseases above-mentioned, and this little volume gives the results of his experience. Knowledge so obtained is always valuable and for those called upon to deal with similar problems the book contains much useful information.

H. S. Stannos.

LEWIS'S MEDICAL & SCIENTIFIC CIRCULATING LIBRARY Catalogue. Part I. Authors and Titles. Part II. Classified Index of Subjects, with Names of Authors who have written upon them. New Edition Revised to the End of 1927. 576 pp. 1928. London H. K. Lewis & Co. Ltd. Gower St. W.C.1 [15s. net. (To subscribers 7s. 6d. net)] [Review appears also in *Bulletin of Hygiene*]

The steady growth of Lewis's Medical and Scientific Circulating Library since its foundation in 1848 is proof that it successfully meets the need for a circulating library open to subscribers generally to supplement the often somewhat exclusive library facilities provided by medical and scientific societies. In contrast with these professional societies, few of which are able to maintain printed catalogues of their libraries, Lewis's Library publishes a catalogue of books for the convenience of its subscribers and contrives to keep this up-to-date in the intervals between new editions by means of printed supplements. A new edition of this useful catalogue revised to the end of 1927 has just been issued. It is in two parts. Part I forming an authors and titles list, with entries under authors' names followed by the full title of book, number of edition, size, price and date of publication. Part II giving the authors' names classified under subjects, thus enabling a user by reference to Part I to obtain particulars of books of importance published in English dealing with any branch of medicine or science generally. The catalogue is carefully prepared and clearly printed and forms a handy and well-nigh indispensable work of reference for subscribers to the Library and for others wishing to ascertain what books have appeared in English on subjects coming within the scope of the Library. The value of the catalogue to these latter might perhaps have been increased by the inclusion of publishers' names, places of publication, notes of the number of pages for each book, and by the insertion of cross references where two or more authors are jointly responsible for a book, but these omissions are probably due to considerations of space and do not seriously detract from the general usefulness of the work.

R. L. S.

TROPICAL DISEASES BULLETIN

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[No 12]

PELLAGRA

VISWALINGAM (A.) Food and Disease in Malaya with Observations on Pellagra and Keratomalacia.—*Malayan Med Jl* 1929 June Vol. 4 No 2 pp 65-69 [12 refs.]

The extent to which ill health and disease in Malaya is due to nutritional disorders is not sufficiently realized. The author discusses the whole question of diet and lays stress upon the changes in our views regarding nutrition in recent times. Particular reference is made to the vitamins and their occurrence in various foods and absence in others is noted. The well-to-do classes tend to eat more than they require while the labouring classes are habitually under fed. Among the latter an ill-balanced diet is more common than one defective in all respects.

The Malay seldom undertakes strenuous labour and he eats rice which is merely husked without milling or steaming. Fish game eggs, fresh vegetables and fruits can be obtained and occasionally meat is eaten. Unless he changes his diet therefore the Malay seldom suffers from any food deficiency disease. As regards the Indian labourer his diet consists of par boiled rice with dal or peas invariably. Dried or fresh fish is occasionally consumed and meat rarely. Tapioca sweet potatoes and green vegetables are often taken. Condiments containing essential oils are used in making curry and fat is supplied as coconut or gingelely oil. Fresh lime juice or tamarind pulp with salt are taken as savouries.

The diet of the Chinese labourer is supplied on a mass production scale. It consists of polished rice of the lowest quality salt fish, pork fat, sweet potatoes tapioca and green vegetables either fresh or preserved. Preserved eggs and fish are occasionally included. No lime juice is employed. In its place however tow-yoo or stale vinegar is used. The vegetables and the pork fat or salt fish are mixed together and fried in kachang oil. These with a little salt and vinegar help him to eat his rice.

It appears therefore, that the Malay and the Indian are fairly well supplied with vitamins B and C and to a less degree with vitamin A also. The diet of the Chinese however is lacking in vitamins B and C. The comparative frequency of scurvy beriberi and pellagra among this race can thus be explained. In addition to the more definite food-deficiency diseases other conditions are met with in the population

arising out of a diet too rich in carbohydrates and too poor in vitamins, proteins and inorganic salts. In infancy and childhood these take the form of rickets, dental caries, keratomalacia and catarrh of the respiratory and alimentary tracts. In adults similarly diarrhoea, dysentery, burning feet, night-blindness, trophic disorders of the skin, in addition to pellagra and beriberi, are encountered.

The author is of the opinion that beriberi and pellagra are perhaps varied manifestations of a long process of intestinal intoxication induced by subsistence on a prolonged diet defective in vitamin B and protein with excess of starch and fat. It is evident from the above that much of the disease and ill-health in Malaya is preventable and it is urged that efforts should be made towards the local production of dietary articles of the right kind.

A. Douglas Bagland.

HEDR (Gordon E.) & MERRILL (John). Pellagra.—*California & Western Med* 1929 May Vol. 30 No 5 pp. 334-338. [Med. School, Univ. of California, San Francisco.]

Both in the San Francisco Hospital and in the State of California pellagra has increased during recent years. Thus in 1920 one case was reported from the hospital and 16 in the State, while in 1925 there were 9 cases in hospital and 63 in the State. During the following year the figures were 13 and 58 respectively. Since 1924 the authors have had under observation 29 cases of the disease at the San Francisco Hospital. Of these 18 were men and 11 women. The disease usually attacked those over 45 years of age. A deficient diet was the most constant aetiological finding and unmarried men were more commonly affected. As regards race it was noted that the disease occurred most frequently amongst the Irish. Seventeen of the men and seven of the women gave a history of extensive use of alcohol and it was thought that gastro-intestinal disease was also a predisposing factor.

On the clinical side there is little to note beyond the typical appearances. Out of eight gastric juice examinations free HCl was absent in six. A mild secondary anaemia was the rule. Twelve of the 29 cases proved fatal. Of these two died of tuberculosis without pellagra symptoms at the time and in ten alcoholic poisoning played a part. Autopsies were performed upon these cases dying of combined pellagra and alcoholism but nothing worthy of note was found. Short after-histories of some of the recovered cases are given.

A. D. B.

TUXEEN (Roy H.). Pellagra associated with Organic Disease of the Gastro-Intestinal Tract.—*Amer J Trop Med* 1929 Mar. Vol. 9 No 2 pp 129-137 [13 refs.] [School of Med., Tulane Univ. of Louisiana, & Charity Hosp. New Orleans.]

Pellagra associated with organic disease of the gastro-intestinal tract has been recorded fairly frequently. In 1916 ROLPH described a case with gastric carcinoma and since then BRYAN BENDER and O'LEARY have recorded similar cases. JOYCE and SEABROOK have noted pellagra with rectal stricture. O'LEARY two cases with carcinoma of the descending colon, NUTUM two cases with carcinoma of the terminal ileum and ELLIOT one with carcinoma of the colon.

The material here presented was gathered from the wards and outpatient department of the Charity Hospital New Orleans. Out of a total of 75 cases 16 showed pellagra associated with some organic disease of the alimentary tract. In only 15 cases was special search made for such disease and the author thinks that the number might have been increased if proctoscopic and X-ray examinations had been carried out more frequently. The sixteen cases represent eight patients with stricture of the rectum two with colitis—one probably tuberculous—and one of each of the following conditions: gumma of the stomach, recto-vaginal fistula and luetic proctitis, cloaca, partial stenosis of jejunum due to old tuberculous ulcer, partial stenosis at the ileocaecal valve due to bands of adhesions and amebic dysentery. The death rate was high, 50 per cent. dying in hospital in spite of thorough dietetic treatment. In the control group without organic disease the death rate was 25 per cent.

Gastric analyses were carried out in eleven cases. In spite of the severity of the disease free HCl was found in six. Of these eleven cases eight had lesions in the colon or rectum. The three which had lesions in the stomach or small intestine all showed absent HCl. Only 38 per cent. of unselected pellagrins in another series showed the presence of free HCl. Though achlorhydria in the author's opinion, is not an essential part of pellagra it probably is an etiological factor of importance by reason of the increase in gastric and intestinal flora to which it gives rise. In this way harmful substances may be absorbed from the intestinal lumen.

During a period of nine months since this article was written the author states that ninety cases of pellagra were admitted to the Charity Hospital. Of these seven had stricture of the rectum and two had cancer of the stomach.

A. D. B.

GOLDBERGER (Joseph) *Pellagra*.—*Jl Amer Dietetic Assoc* 1929 Mar Vol. 4 No 4 pp 221-227 [Summary appears also in *Bulletin of Hygiene*]

On a conservative estimate 120 000 people in the United States suffered from an attack of pellagra during 1927. The disease is strikingly limited to the southern states and affects different states to a greatly different degree. Thus while Virginia and Florida have been lightly affected, the Carolinas have been sorely stricken. There is a marked seasonal incidence, 80-90 per cent. of cases appearing in the period April-August, and there is a marked tendency to recurrence of the disease at this time. It is mainly a disease of children though generally of a mild type whilst the more severe cases are prone to occur amongst adult females. The endemic disease varies in its incidence with changing economic conditions, a decrease in purchasing power being liable to be followed by an increase in the incidence. It may now be stated that pellagra is a vitamin deficiency disease analogous to scurvy and beriberi. By omitting the pellagra preventing (P-P) factor from the diet of dogs and rats a disease very similar to pellagra has been produced. The available evidence justifies the inference that all foods known to contain vitamin B contain the pellagra preventive. Foods rich in vitamin B are rich in the pellagra preventive but the converse does not hold for lean beef which is a poor source of vitamin B as judged by

the rat-growth test, is a very good source of P-P. The reasons for failure to include the P-P factor in the diet are various. Economic factors of all types play the greater part, but the sporadic cases occurring in well-to-do persons are due to finicky or faddy eating. The problem of eradicating the disease is complicated by dietary habits which are themselves, to some extent related to climatic conditions and then to the seasonal availability of certain foods. Improvement in basic economic conditions is the only general cure though education of the people will help meanwhile.

H. N. H. Green.

DJAPANTSE (P. S.) [La pellagre en Abkhazie.] [Pellagra in Abkhazie.]—*Russian J. Trop. Med.* 1928. Vol. 6 No. 10 pp 634-634. With 2 text figs. [22 refs.] [In Russian. French summary p. 634.]

In July 1927 the author had occasion to investigate malaria and helminthiasis in Abkhazie. In the course of this survey 22 cases of pellagra were noted. Of these 10 were men, 12 women and 1 child. All belonged to the peasant class. Their diet contained unspiced maize and often green vegetables and fruit, though two of the cases had never eaten maize at all. Treatment consisted of a five to six weeks' course of neo-salvarsan injections followed by a longer course of arsenic given orally. The result was satisfactory.

[The actual total of cases mentioned was 22, but when sex incidence was investigated the number became 24 and when nationality was in question the number fell to 21. It is fortunate that the success of treatment did not depend upon simple mathematics!]

A. D. B.

ALCHIBAJA (K.) [Pellagraepidemie in Mingrelia.] [Epidemic of Pellagra in Mingrelia.]—*Nachrichten der Tropischen Medizin Tiflis* 1928. Vol. 2. No. 6 pp 332-335. With 2 text figs. [In Georgian script. German summary pp 409-410.]

In the Georgian province of Mingrelia pellagra, which was formerly of rare occurrence at the end of 1928 became epidemic. In the out-patient clinic at Sugdidi 107 cases were diagnosed. Of these 20 were men, 69 women and 18 children. All the classical symptoms were present.

Mingrelia is a country where much maize has been grown and consumed for centuries. In spite of this pellagra was rare. The author attributes this epidemic to a deficiency of good, unspiced maize. Whereas formerly the people in good harvests were able to pick the best grains only in recent years following several poor crops they were forced to import inferior maize and to harvest their fields before the crop was ripe.

A. D. B.

MACHWILADZE (Nico) Ueber die morphologischen Veränderungen des Blutes bei Pellagra. [Morphological Blood Changes in Pellagra.]—*Arch. f. Schiffs u. Trop. Hyg.* 1929. Mar. Vol. 33. No. 1. pp. 152-167. [32 refs.] [2nd Med. Clinic, State Univ. Tiflis, Georgia.]

The following blood changes are described in pellagra. The red cells are always reduced in number and this reduction bears no relation to the duration of the disease but depends rather upon the severity of the case. The haemoglobin percentage is usually diminished and the colour index usually raised. The leucocytes are diminished in number as are also the platelets, and the reduction of the latter is not propor-

tional to a similar reduction in other elements. The absolute lymphocyte count is usually normal though the relative percentage is raised. An increase of the neutrophil percentage suggests complications as in ordinary cases it is diminished. Basophil cells and monocytes are usually normal and any eosinophilia points to infection by parasites. The Arneth count shows a moderate shift to the left. Stained films show that the red cells vary very slightly from the normal.

From his observations the author concludes that pellagra is due to a toxin which acts upon the haemopoietic system.

A. D. B.

GAVRILA (I) La vitesse de sédimentation des globules rouges dans la pellagre [Rate of Sedimentation of Red Cells in Pellagra].—*C R Soc Biol* 1929 Mar 8 Vol. 100 No 9 pp 685-686

The sedimentation rate of the red blood corpuscles has not previously been studied in pellagra. Observations are here recorded upon ten cases having characteristic skin lesions. The method of Westergreen Katz was employed and in each case two examinations were made at two day intervals. Readings were taken half hourly during two hours and again after twenty four hours.

The results are shown in a table from which it is clear that the sedimentation rate is markedly increased in pellagra.

A. D. B.

CARRANCA (R.) & TRUJILLO El maíz germinado en el tratamiento de la pelagra [Germinated Maize in the Treatment of Pellagra].—*Rev Méd Barcelona* 1929 May Year 6. Vol. 11 No 65 pp 439-441 [2 refs]

The authors employ maize which has been kept in a moist atmosphere till it germinates washed and triturated to a paste for treating cases of pellagra. Water and sugar are added according to the patient's taste the initial dose being 50-60 gm. daily. Sometimes mild symptoms of intolerance are evident in the earlier days—slight diarrhoea and a sense of fulness—but these soon pass off. They report very good results except in advanced stages.

H. Harold Scott.

GOLDBERGER (Joseph) WHEELER (G. A.) SYDENSTRICKER (Edgar) KING (Wilford I.) & others A Study of Endemic Pellagra in some Cotton Mill Villages of South Carolina.—*Hyg Lab Bull No 153* Washington 1929 Jan pp vi+85 With 20 figs [26 refs.]

All the chief points of interest in this paper have already been noted in the *Bulletin* (ante p 358)

A. D. B.

BERIBERI.

MITCHELL (J.) Cases of Beri-Beri from the Persian Gulf.—*Jl Roy Nav Med Serv* 1929 Jan. Vol. 15. No. 1 pp. 44-47

Eight cases of beriberi occurring in a ship serving in the Persian Gulf are described. The first case was noted in March, but it was thought that the ship's prolonged stay on the Trucial coast during May and June was largely responsible for the other cases. Three of the cases occurred at Bushire where the disease is not endemic. From the case histories given it appears that cardiac symptoms predominated in only two cases were the knee jerks absent. There were two deaths.

The first case was reported at a time when fresh and varied food was plentiful. Later fresh vegetables could not be obtained, the local meal was poor in quality, fish was scarce and the men were dependent on an insufficient weekly fruit ration from Bombay. Four of the cases were British ratings and the quantity of rice consumed by these was negligible.

In spite of the fact that tinned food formed a large part of the dietary during the summer and that debility was prevalent among the men, the possibility of the infectious nature of the beriberi outbreak was entertained. The ship was therefore subjected to thorough weekly disinfection. Since it was impossible to obtain fresh vegetables the following arrangements were made viz., dried peas were soaked for 48 hours previous to cooking, unpolished rice was substituted for the polished variety and yeast was given three times daily to all cases of debility.

A. Douglas Bigland.

JOUEDRAN (E.) & LE MEILLON. Utilité des examens radioscopiques répétés au cours des affections cardio-vasculaires des bérubériques. [*Radioscopic Examinations in Cardiovascular Beriberi States*.]—*Far Eastern Assoc Trop Med Trans Seventh Congress, British India 1927* Vol. 1 pp. 434-445. With 43 figs.

Alterations in the size of the heart in cases of beriberi observed radiologically by orthodiagrammatic methods are here described. In order to have an adequate series of controls three groups of the community were first carefully investigated by these methods. Series A comprised ten Annamites in hospital for surgical conditions without cardiac or pulmonary complications, series B was made up of ten hospital orderlies, and series C was chosen from among healthy prisoners.

The technique and the accurate measurements and diagrams figured and described would be of interest only to specialists. Suffice it to say that an increase in all the diameters of the heart cavities was found to be the rule in beriberi.

A. D. B.

MEBIUS (J.) Oedemtheorie der Beri-Beri und physiologische Wirkung des Vitamins B. [*The Oedema Theory of Beriberi and the Physiological Action of Vitamin B.*]—*Verh Arch. f. Path. Anat.* 1929 Feb. 27 Vol. 271 No. 2 pp. 432-449 [37 refs.] [Summary appears also in *Bulletin of Hygiene*]

The author from careful examination of the hearts from three cases of acute beriberi observed that oedema of the cardiac muscle is present

and that this oedema is chiefly intracellular affecting adversely the anisotropic substance of the muscle fibre. The excess of water in this situation naturally interferes with the normal fluid exchange within the fibre, and therefore with its contractility. This pathological condition in the heart muscle the author believes to be a primary phenomenon and not secondary to neuritis of the cardiac nerves. He goes on to show that the control of osmotic pressure depends upon the presence of vitamin B and that when this factor is deficient full muscular contractility is impossible owing to water absorption. Such a state of affairs obtains in beriberi and the disease is defined as one in which there is a disturbance in the osmotic pressure in the anisotropic substance of muscle.

The author then considers the question whether this alteration in the osmotic pressure can satisfactorily explain the whole picture of the disease. It is argued that the cardiac weakness the low diastolic blood pressure the muscular paralysis (including that of the diaphragm) the constipation the anasarca and the paraesthesiae of beriberi are in fact, due to this cause.

A. D. B.

MATSUMURA (S.) KAKINUMA (G.) KAWASHIMA (K.) TANIKAWA (K.) OCHIAI (S.) MIYATA (R.) FUJISAKI (K.) KANAO (R.) NOGUCHI (K.) AOKI (K.) SATO (T.) ITO (K.) & SUZUKI (M.) *The Etiology of Beriberi*.—*Jl Amer Med Assoc* 1929 Apr 20 Vol 92 No 16 pp 1325-1327 [Dept of Hyg Govt Univ of Med. Chiba, Japan.]

— Estudos sobre a etiologia do Lakkê ou beri-beri.—*Rev Med-Cirurg do Brasil* 1929 May Vol 37 No 5 pp 155-168 With 1 plate

There are many facts concerning beriberi which the authors maintain cannot be explained by the vitamin hypothesis of the disease. Thus (1) The main diet in Japan is rice all the year round. During the winter the fields are frozen and vegetables cannot be readily obtained. The people are therefore forced to subsist largely on rice and yet beriberi occurs much more commonly in the summer. In sub-tropical and tropical areas such as Formosa, South China, French Indo-China, the Malay States and Java the disease prevails all the year round. (2) The incidence of beriberi appears to be associated with unsatisfactory environment. (3) When the disease occurs in a single situation, e.g. in a ship or factory it tends to spread gradually while others living on the same diet but in different surroundings may escape. (4) Overstrain lack of exercise insufficient sleep and intemperance predispose to beriberi. (5) Japanese statistics show that the epidemic tendency of beriberi varies from year to year just as it does in other epidemics.

Feeding experiments conducted by the authors show that pigeons fed on polished rice develop polyneuritis gallinarum in from two to seven weeks. This experimental disease can be divided into two types—the paralytic spasmodic form and the paralytic non-spasmodic form. The first responds well to vitamin B treatment but if feeding with polished rice is continued, even when vitamin B is given also a relapse occurs and the bird dies usually within nine days. In the second type even under the most favourable conditions the injection of vitamin B is

a test of uncertain value. These results in addition to the five points given above are very difficult to explain by the vitamin deficiency hypothesis.

An organism resembling *B. coli communior* was found in relatively large numbers in the intestines of experimental animals and in human beriberi cases. The differentiation of this organism, which is called *B. beriberi*, from *B. coli communior* depends upon the fact that the former agglutinates and gives a complement fixation reaction, while the latter does not. In a series of 32 pigeons fed upon polished rice two never developed *B. beriberi* in the faeces, while in the others periods varying from eight to 34 days elapsed before its appearance. Symptoms of disease were noted in from 4 to 14 days after the bacillus was found. Out of 135 cases of human beriberi the specific organism was present in the faeces of 98 (74 per cent.). The stools of non-beriberi cases were examined and here the incidence of the specific organism was only about 1 per cent. Fowls with beriberi show considerable agglutinating power usually in titres of 200 to 500. Re-induction of the disease after initial recovery gave much higher figures 1:1 000 or more. Taking 1:50 as the lowest titre of diagnostic value in 30 consecutive human beriberi cases a positive result was obtained in 25 (83 per cent.) while in 40 normal persons the positive figure was only 7.5 per cent.

The authors claim that the beriberi bacillus "should be judged the principal aetiological factor in experimental beriberi."

A. D. B.

TAYLOR (J.) & THANT (U.) Observations on Vitamin B Deficiency in Pigeons (including the Occurrence of Refection).—*Indian J. Med. Res.* 1929 Jan Vol. 16, No. 3 pp. 747-765. With 5 charts. 5 refs. [Pasteur Inst. Burma.] [Abridged from summary appearing in *Bulletin of Hygiene*.]

Observations on beriberi columbarum. Pigeons fed on certain natural items of Indian dietary deprived of the antineuritic fraction of vitamin B by the action of heat develop a condition termed beriberi columbarum by McCARRISON. In the present series of experiments the highest incidence of this condition occurred on a diet of autoclaved rice and dhal (a name given to various pulses) with a high protein content. That the condition was due to the deprivation of the antineuritic vitamin was shown by the fact that birds given unautoclaved dhal did not develop the condition. The post-mortem findings were in some cases masked by a starvation factor but in other cases were typical and exactly the same changes were noticed in the heart, for instance as are found in human beriberi.

The effect of cooking on the antineuritic value of dhal and atta. As stated above dhal is the name given to various pulses, atta is a coarsely milled Indian wheat flour and is a staple food in northern India, where beriberi is rarely seen. It is little used in the southern parts of the country or in Burma, where the staple food is rice. Dhal is used to a certain extent by those whose staple dietary may be either rice or atta. It was found that in the cooked state dhal is not capable of furnishing a supply of vitamin B to replace adequately any deficiency in a rice dietary, atta being of the greatest value for this purpose. It is probable that the difference in vitamin B content of the atta and dhal may be due to the different methods of cooking employed.

A. F. Watson.

BANERJEE (Kali Gati) On a Recent Outbreak of Epidemic Dropsy in the District of Birbhum.—*Indian Med Gaz* 1929 Apr Vol. 64 No 4 pp 181-182.

During the months October November and December 1928 the author saw 100 cases of beriberi in the district of Birbhum Bengal. Clinically the majority had absent knee jerks, anaesthetic points over the shins occurred in some all experienced great pain on squeezing the calf muscles and the squatting test was positive in only a few. Five types of the disease were noted (1) *Febrile cases* fever usually set in two or three days after the oedema of the legs appeared it did not rise above 101 and there was usually a fall in the evening (2) *Dry cases* here there was paresis of the legs and tender calves but no oedema. Only one case of this type was seen (3) *Gastro-intestinal type* diarrhoea indigestion nausea and vomiting were present in about three-quarters of the cases (4) *Fulminating or cardiac cases* associated with cardiac dilatation. One of these died on the seventh day (5) *Simple cases* these showed only oedema of the legs most marked towards the evening and they were able to carry on their ordinary duties. Further clinical details are given in a table comprising 28 cases.

The treatment was mostly dietetic. Patients and those residing in the affected area were instructed to take the following foods germinating grain oranges lemons tomatoes raw onion leaves cabbage leaves unboiled milk eggs—quarter boiled molasses yeast from the date palm (palmyra tree) bread khichuri, i.e. a mixture of rice and whole grain mung or moosurie boiled together beans. Medicinally various vitamin products together with general and cardiac tonics were administered.

In the author's opinion this epidemic was certainly due to the use of mustard oil. Whether the oil was infected with the spore-forming bacillus of *B. vulgaris* type (found in infected rice by ACTON and CHOPRA) was not determined [see this *Bulletin* Vol. 22 p 582]. Arguments are put forward against the infected rice theory of epidemic dropsy.

A D B

GHOSH (U) Epidemic Dropsy in Birbhum.—*Indian Med Gaz* 1929 Apr Vol. 64 No 4 pp 182-183 With 1 map in text.

During November 1928 the author was called to see a household in Suri consisting of eleven persons eight of whom had oedema of the feet. It was found that they all partook of mustard oil obtained from a single source in Santhia about eleven miles away. Further cases were reported in other households in Suri and all had obtained mustard oil from the same source. Later it was found that 30 cases confined to eight or nine families had occurred in Santhia itself and this was followed by outbreaks in the neighbouring villages. The distribution of the cases is shown by means of a map.

The outbreak was thought to be due to a particular consignment of mustard oil. It was discovered that the owner of the oil mill had received some four months previously four or five wagon loads of a particular seed, resembling pakra seeds. Also it appeared that a seed resembling mustard seed grows wild in the local jungles and this is

sometimes mixed with the real product. Such adulteration may possibly have been the cause of the outbreak. Neither vitamin B deficiency nor infected rice appeared to be responsible.

A. D. B.

DALAL (K. R.) Report on the Investigation of an Outbreak of Epidemic Dropsy in Rangoon in the Year 1924.—*Indian Med. Gaz.* 1929. Jan. Vol. 64 No. 1 pp. 19-20

Particulars of an outbreak of epidemic dropsy the first of its kind occurring in Rangoon during the year 1924, are here supplied for the use of those interested in the epidemiological aspects of the disease.

Out of 174 cases recorded six proved fatal. Almost all the patients belonged to the Bengalee Hindu community. The outbreak was sudden in onset the first cases being reported in July 1924. The maximum incidence was reached in the third week of July and by the middle of August the disease had practically disappeared. In most instances the various adult members of a family were attacked at very short intervals but even in these families there was not a single case recorded among children living on milk diet only.

As regards the cause of the outbreak it is definitely asserted that neither vitamin nor other food deficiency was responsible as most of the sufferers were well-to-do people. The impression gained at the time was that the probable causative factor was some infection or chemical toxin derived from a particular consignment of rice or mustard oil imported from Calcutta. Samples of both products were sent for analysis. It was found that most of the rice samples contained highly diseased grain but the mustard oil gave negative results.

A. D. B.

PEDRO (Wiseman) O beriberi é endêmico em Goa? (Comunicação) Is Beriberi Endemic in Goa?—*Arquivos da Escola M d. Ciênc. de Goa* 1929. Ser. B. No. 2. pp. 181-209

Five cases of multiple neuritis accompanied by cardiac symptoms and some by oedema are briefly recorded, whose history, diet and clinical symptoms all coincide with true beriberi, and the author answers the question postulated in his title in the affirmative.

H. Harold Scott.

HELMINTHIASIS

PEVERELLI (P) Searching for Worm-Eggs with the Aid of Cedar-Oil Preparations.—*Meded Dierst & Volksgezondheid in Nederl Indië*. 1928 Vol. 17 Pt. 4 pp 569-572. [Med Lab Weltevreden.]

Peverelli has tested HEIN's method (*Jl Lab & Clin Med* Vol. 12, p 1117) which consists in drying a thick smear of faeces at room temperature putting on cedar oil and covering thus rendering faecal matter transparent. The control was an eosin preparation and 105 samples of faeces were examined of which 7 were negative. The method is held to correspond to a thick blood film in malaria diagnosis and to offer the advantages of the concentration methods with the proviso that it has not got their disadvantage that they often fail. Regarding results the eosin preparations failed in 24 instances in which the cedar oil preparations gave *Trichuris* 5 *Ascaris* 3 hookworms 6 (so presumably 24 should read 14) while the cedar oil failed 6 times namely *Trichuris* 3 *Ascaris* 2 and hookworm 1. Both in the total number of eggs counted and in the time taken to find the first egg the advantage of clearing with cedar oil [just as with glycerine] is marked with eggs whose shell is coloured, such being *ascaris trichuris* and *clonorchis*. When *ascaris* loses its outer coloured shell this will not be so. For *ankylostome* eggs there is little difference between the results given by the two processes if such extremes as 50 minutes compared with 1½ minutes or 30 seconds with 30 minutes be excluded and it is noted that these eggs may shrivel and disappear though not it is held if examination is made within half an hour.

Clayton Lane

SMIRNOV (G.) [Quantitative Helminthic Analysis. (Methods of Investigation).]—*Rev Microbiol Epidemiol et Parasit* 1929 Vol. 8 No 1 pp 63-78 With 6 text figs [Numerous refs] [In Russian. English summary p 118.]

The importance is emphasized of quantitative methods of diagnosis that is of counts of worms and eggs hookworm infection being in the writer's mind. Egg counts are preferred to worm counts and Clayton Lane's DCF is declared the most accurate. Stoll's technique is held most acceptable for mass counting but owing to its ineffectiveness in light infections it must be controlled by DCF. Hung's method (the Hamburg cover glass) is the least accurate. Certain determination of the degree of infection from the number of eggs is clearly dependent on regular noncyclical oviposition, but in mass work such individual variations will be neutralized.

C. L.

GINESTET (Gustave) A propos de vers intestinaux. (Intestinal Worms).—*Rev Prat Malad des Pays Chauds* 1929 Jan. Year 8. Vol 9 No 1 pp 664-665

In two cases of penetrating abdominal wound with exit in the buttock portions of taenia escaped from the exit wound. In a third case a wound in the pubic region necessitated a median laparotomy a loop of small intestine disclosed a linear thickening about 20 cm. long with at one end a small patch where the intestinal wall was so thin that

perforation was imminent on incising this spot the thickening turned out to be an ascaris which had nearly perforated the intestinal wall.

C. L.

PIMENTEL (Candido) Tratamento moderno das helmintoses pelo tetrachloreto de carbono. [Treatment of Helminthiases by Carbon Tetrachloride.]—*Folha Med* 1929 July 5. Vol. 10 No. 19 pp. 224-225.

It is pointed out without however mentioning the dosage used, that chenopodium has produced many cases of intoxication. It is held that absorption of carbon tetrachloride depends on its fluidity and that when put up in solid solution it is slowly absorbed. Accordingly Merck put it up in a solid which melted at body temperature. This melting being judged too rapid, the drug is now dispensed under the name neonecatorina in capsules in a matrix which does not completely melt till 50 C. is reached each containing 0.7 gm. of the drug. The dosage of tetrachloride used, in years and grams is, 5 to 7 0.7 gm. 8 to 10 1.4 11 to 13 2.1 14 to 16 2.8 17 and over 3.5. The method is held to be of incomparable value, eliminating in these doses all hook worms from laboratory animals of unstated weight and as being efficient too against ascaris taenia and strongyloides. Ten hookworms are stated to be more harmful than the equivalent weight of other parasites infesting man.

C. L.

FAUST (Ernest Carroll) Parasitichial Potencies of the Tri- to Hepta-Methyl Derivatives of Rosaniline.—*Proc. Soc. Experim. Biol. & Med* 1929 June Vol. 26. No. 9 pp. 748-750. [3 refs.] [Peking Union Med. College Peking, China, & Tulane Univ. New Orleans.]

In dilutions of 1 in 1 000 000 dahlia crystals (tri-methyl rosaniline) allow free growth of *B. subtilis*. The drug was without measurable effect against clonorchis in guineapig and pup. Methyl green (hepta-methyl para-rosaniline) was not measurably clonorchicidal, but was toxic to animals, and allowed free growth of *B. subtilis*. For this bacillus gentian violet and methyl violet which contain different mixtures of tetra penta and hexa-methyl para-rosaniline were less toxic than crystal violet which is pure hexa methyl para-rosaniline but as clonorchicides no difference between these compounds could be determined.

C. L.

LOHMEYER (E.) (Die Darmwurmerkrankung der Bevölkerung der Stadt Kutais und deren Kreises nach den Daten des kutaischer bakteriologischen Laboratoriums.) [Intestinal Worm Infestation of the Town and District of Kutais, Georgia.]—*Vierteljahrsschrift der Tropischen Medizin* T. 11 1929 Vol. 2. No. 4 pp. 289-302. [In German script German summary p. 326.]

From 1924 to 1927 this laboratory made 2 897 faecal examinations, presumably sincere, 83.68 per cent. being positive for intestinal parasites. The percentage infection rates found were trichuris 42, ascaris 37 and ankylostomes 3 the last being very widely distributed. Protozoa were present in 3.9 per cent.

C. L.

SANDGROUND (J. H.) A New Liver Fluke from a Monkey and New Parasitic Roundworms from Various African Animals.—Reprinted from *Proc. U.S. Nat. Museum* 1929 Vol. 75 Art. 12 pp 1-11 With 9 figs on 2 plates [5 refs.]

The forms described are *Dicrocoelium colobusicola* n. sp. from the liver of a Colobus monkey *Leiperiatus* n. g. with *Nematodirus kopkeni* (Leiper 1910) from the hippopotamus as its sole and therefore type species *Osmaldocrurus agassiz* n. sp. from the intestine of *Agama colonorum* *Colobostromylius strongi* n. g. n. sp. from *Colobus polykomos*

C. L.

- i. EL BATASH (M. H.) **The Nile as a Source of Infection with Schistosomiasis. A Survey of an Island in the Nile opposite Cairo**—*Jl Egyptian Med Assoc* 1929 Apr Vol. 12. No 4 pp 41-46
- ii. HELARY (M. M.) **Observations on the Presence in the Nile in Egypt of the Molluscan Intermediate Host of *Schistosoma haematobium***—*Ibid* pp 47-49 With 3 figs. on 1 plate. [4 refs.]
- iii. ONSY BEY (Amis) **Bilharzial Infection of the Spleen and Egyptian Splenomegaly**—*Ibid* pp 50-53 With 2 figs.
- iv. FOUAD (Abdel Megid Mohammed) **A New Method for detecting *Schistosoma mansoni* Ova in the Stools.**—*Ibid* p 54

i. In Rodah Island opposite Cairo examination by unstated techniques gave percentages of infection as follows, *S. haematobium* 25.5 ankylostomes 18 ascaris 3.7 *H. nana* 17.6 trichostrongylus 1. The snails found on the shores are listed. Planorbis and *S. mansoni* were absent.

ii. A water plant *Polamogelon crispus* appears particularly pleasing to *Bullinus* and is broadcast in large masses into river and canals with adherent snails and their eggs during the Nile flood.

iii. It is now believed that bilharzia is an important factor in Egyptian splenomegaly the findings being nodules accompanied by active multinucleated giant cells digesting the schistosome eggs. There follow eosinophilia and fibrosis

iv. The deposit from concentrated salt solution is pipetted off and examined.

C. L.

GOLDIE (Horatio) Zur Pathologie und Therapie der chronischen Bilharziosis. [Pathology and Treatment of Chronic Schistosomiasis.]—*Arch f Schiffs u Trop Hyg* 1929 Apr Vol. 33 No 4 pp 198-210 [22 refs.] [Hadassa Polyclinic Tiberias Palestine.]

Schistosoma haematobium is not endemic about Tiberias nor has *Bullinus* been found there. Goldie has however met there two classes of urinary schistosomiasis established by finding the eggs. In the one onset is acute there has been bathing in pools in Egypt or in streams in Nahr el Auja by men of 17 to 32 the symptoms are urinary and indeed in some cases the men had been saddled with a diagnosis of gonorrhoea and treated for it these cases cleared up with tartar emetic, the

criterion of cure being absence of ova a month after cessation of treatment. The other class was quite different. When Goldie instituted routine microscopic examination of the urine schistosome eggs were found in 28 Kurdish Jews, nearly all women who came up for anaemia, menstrual trouble, lumbar or hypogastric pain, and pneumonia, acute or chronic, from Arwil, Erbil or Arbail the ancient Arbela in Iraq. Cellular elements in the urine were generally few or none and the condition had lasted generally from 3 to 5 and in one case 10 years. Tartar emetic proved an unsatisfactory remedy. Antimosan (40 to 75 cc. in all) was used in 19 cases, 14 being negative for eggs 3 months later.

C. L.

KHALIL (M.) NAZMI (M.) PETER (F. M.) EL DIN (M. Salah) & EL BETASH (M. H.) Die Behandlung der Schistosomiasis mit intramuskulären Fuadin-Injektionen. [Treatment of Schistosomiasis with Intramuscular "Fuadin" Injections.]—*Deut. Med. Woch.* 1929 July 5. Vol. 55. No. 27 pp. 1125-1126 [2 refs.] [Faculty of Med. Cairo]

Fuadin, an antimonial preparation propitious for Egyptian use was given intramuscularly to 300 schistosomiasis cases in 7 per cent. solution. The adult dosage was in the last 50 cases 1.5 cc. on the first day 3-5 cc. on the second and 5 cc. on the third. Thereafter the last dosage was continued on alternate days up to the fifteenth, or nine injections in all. No death occurred. Comparing this experience with that of tartar emetic, of which more than 400,000 intravenous injections were given in Egypt during 1928, it is concluded that fuadin gives slight or no local reaction as compared with occasional inflammation, abscess or necrosis with tartar emetic; no general reaction as compared with frequent cough, vomiting and fainting; late vomiting in 2.5 per cent. of cases compared with fever continued vomiting, jaundice and sudden death with tartar emetic, the statement being unqualified; a two-weeks instead of a four-weeks treatment; but at a relatively high instead of a low cost. If living eggs are found after the ninth injection one or two more must be given; yet sometimes the lethal effect on eggs is observable only after the course has stopped, indicating a cumulative effect. A two-way syringe allows of the use of a common solution, the needles being sterilized for each case.

C. L.

OZAWA (Makoto) Clinical, Histological, and Statistical Observations on Schistosomiasis japonica as the Cause of Acute Appendicitis.—*Jikken Igaku Zasshi* 1929 Nov. Vol. 7 No. 1 [Summarized in *Japan Med. World* 1929 Mar. 15 Vol. 9 No. 3 p. 83.]

Ozawa has compared the histological findings of 20 cases of appendicitis (4 acute and 16 chronic) with those of six cases of other surgical intestinal affections, infection with *Schistosoma japonicum* being common to all. Eggs were present in all cases, but inflammatory changes in the former only and with them bacterial infections. Moreover it is stated that many cases of appendicitis occur in localities where schistosome infection is endemic and very few where it is not. Accordingly he concludes that there is a close relationship between the schistosome and appendicitis.

C. L.

- i. HARRIS Jr (H Elwin) *Appendicitis caused by Bilharzia.*—*Brit Med J* 1929 May 4 pp 810-811
- ii. PERRY (H Marrian) & BEXSTED (Harold J) *Appendicitis as a Complication of Bilharzial Infection.* [Correspondence]—*Ibid* June 8 pp 1059-1060

i. The record is of a native of the Nile Delta whose appendix was removed after his third attack of appendicitis. It was bright red and contained ova of *Schistosoma haematobium* some calcified with surrounding engorged vessels and extravasated leucocytes. The blood showed a 12 per cent. eosinophilia. I have been unable to find any instance of appendicitis caused by this parasite.

ii. In Egypt over 50 per cent. of appendices removed for appendicitis show the picture described above. It is questionable however whether the inflammatory process is due in all cases to the presence of these sources of irritation.

C. L

- i. JAGUBOFF (F) [Trematodosen der Leber bei Menschen in Aserbeidschan.] [*Liver Trematodes in Man of Aserbaidjan.*]—*Rev Microbiol Epidemiol et Parasit* 1929 Vol 8 No 1 pp 40-44 [5 refs.] [In Russian. German summary pp 114-115] [State Inst. for Microbiol. & Hyg. Baku.]
- ii. PLAVTOV (K.) [Distomiasis among the Population of Nakhichevan.]—*Ibid* pp 49-53 [In Russian. English summary pp 116-117] [People's Commissariat for Health Nakhichevan.]
- iii. KARIBOW (N) [Zwei Fälle der *Fasciola hepatica* Invasion.] [*Two Cases of F hepatica Infection.*]—*Nachrichten d Tropischen Medizin* Tiflis. 1928. Nov Vol. 1 No 1 [In Georgian script. German summary p 113]
- iv. KOULAGUINE (S M.) [Transit d oeufs de trématodes par le tractus intestinal de l'homme.] [*Passage of Trematode Eggs by the Intestinal Tract of Man.*]—*Russian J Trop Med* 1929 Vol 7 No 2 pp 131-135 [In Russian. French summary pp 135-136]

i. In the course of examining 900 men during 4 months trematode eggs were found in 3. In the first *Fasciola hepatica* eggs were detected in 13 of 14 examinations spread over two-and-a-half months the liver being greatly enlarged. In the second the same eggs were found in a similar case. In the third *Dicrocoelium lanceatum* ova were seen on each of 3 examinations the liver being greatly enlarged and tender haemoglobin 18 to 25 red corpuscles 1 600 000 to 1 800 000. He was also infected with hookworms. In a note Professor SPRODOWSKI adds another and similar case of infection with *D lanceatum*.

ii. By unstated methods the following infections were found apparently in 909 persons—*Ascaris* 444 *Trichuris* 343 *Taenia saginata* 128 *Hymenolepis nana* 30 *Oxyuris* 20 *Trichostrongylus* 8 *Dicrocoelium lanceatum* 8 *Fasciola hepatica* 1. Local sheep were heavily infected with the last two and *Linnaeus* and *Planorbis* exist. A case of *D lanceatum* infection apparently typical of the eight had loose stools, vomiting, weakness and anaemia, that is symptoms not necessarily implicating the liver.

iii. Two boys of 11 in different Georgian provinces suffered from anaemia and eosinophilia. One had biliary colic, the other had not. *Fasciola* eggs were found in the duodenum by sound and in the faeces. Emetine caused eggs and symptoms to disappear.

come under his personal observation. The subjects had lived in America 4 to 36 years. In those tested, eosinophilia varied from 0.5 to 12. In only one case was there no history of tasting raw fish, the customary procedure when preparing the Jewish delicacy of "gefilte fish" seasoned before cooking. In his cases there were no characteristic symptoms. He points out that in Finland pernicious anaemia occurs in about 1 in 6000 of carriers of the broad tapeworm. Baer reports one case of "pernicious" anaemia in which infestation was discovered on the second admission to hospital only nor did disinfection cure the anaemia—she died of it. Treatment is with 6 gm. of oleoresin of aspidium, the male fern, with fasting and purging. The head may be missing without recurrence.

C. L.

FAUST (Ernest Carroll) What is *Sparganum mansoni*?—*Jl. Trop. Med. & Hyg.* 1929 Mar 15 Vol. 32 No. 6 pp. 76-77 [Dept of Trop. Med., Tulane Univ., New Orleans.]

Faust's reply to the question in his title is that *Sparganum mansoni* has been used for all unbranched spargana recovered from man and that several species have identical shape. They can be distinguished only by producing development to the adult. From the point of view of nomenclature since the original form studied by COBOLD is unrecognizable and since JOYEUX (1927) is the first worker to have used the species name *mansoni* in a recognizable description of an adult worm developed experimentally from the sparganum stage, the original term (*Sparganum mansoni* Cobbold, 1883) must give way to the amended or restricted one of Joyeux, by which is meant the sparganum stage of *Diphyllobothrium mansoni* Joyeux, 1927. The normal intermediate host of this worm is *Rana esculenta* and A. S. CAMPBELL of Foochow China has obtained, from two patients from whose fingers he extracted spargana, histories that freshly split frogs had been applied to them as poultices.

C. L.

JOYEUX (Ch) & BAER (J G) Recherches sur le cycle évolutif d'*Hymenolepis fraterna* Stiles. [The Developmental Cycle of *H. fraterna*].—*C. R. Soc. Biol.* 1928. Nov. 2. Vol. 99 No. 31. pp. 1317-1318.

BACIGALUPO of Buenos Aires has made unpublished researches which lead the authors to conclude that his *Hymenolepis intermedius* (which their *H. bacigalupo* replaced owing to preoccupation) is identical with *H. fraterna*. In Paris the authors have succeeded in transmitting *H. fraterna* without intermediate host in 100 per cent of their experiments. Failure only occurred when the rats used were old or already spontaneously infected. *H. fraterna* was never found by the authors in *Tenebrio* or other insect although BACIGALUPO has found naturally infected *Tenebrio* in Brazil.

R. T. Leiper

LARROUSSE (F) Hôtes intermédiaires nouveaux d'un cestode de la souris *Hymenolepis microstoma* (Dujardin 1845) [New Intermediate Hosts of *H. microstoma*].—*C R Soc Biol* 1929 Apr 8 Vol. 100 No 11 pp 855-857 With 1 text fig [2 refs] [Inst of Hyg & Bact Strasbourg]

Cysticercoids identified by JOYEUX as *Hymenolepis microstoma* Dujardin were found by Larrousse in *Gnathocerus cornutus* Fabr and *Trogosita mauritanica*. The former insect is illustrated. Both are Coleoptera

C L.

BACIGALUPO (Juan) Un nuevo huésped intermediario del *Hymenolepis diminuta* (Rudolphi 1819) el *Ulosoma parvicornis* Fairmaire 1892. [A New Intermediary Host of *H. diminuta*].—*Semana Méd* 1929 May 23 Vol 38 No 21 (1845) pp 1339-1340 With 2 text figs

Two of three specimens of *Ulosoma parvicornis* collected from rat hutches contained in their body cavities cercocysts of *Hymenolepis diminuta*. Of 14 collected from hutches containing guineapigs and rabbits, two were free of infection. The other 12 were fed on eggs of the tapeworm the results are to be given later. Larval stages of this small coleopteron were uninfected

C L.

RAMERI (Gustavo) Sindromi raro di parassitosi intestinale. Nota I. Teniasi a sindrome appendicolare e pseudoneoplastica. [Taenia Infestation with Appendicular Symptoms].—*Riforma Med* 1929 Feb 23 Vol. 45 No 8 pp 255-258 With 2 text figs

A man of 37 suffered from symptoms suggesting appendicular colic, looked well, had no fever but had a visible and palpable tender elongated swelling in the ileo-caecal region. X rays after opaque meal and enema showed a clear area in this region, tapeworm eggs were present in the faeces an anthelmintic expelled *Taenia saginata* and recovery followed

C L.

ABULADZE (Sol) [Zu der Methodik der Anfertigung der Dauerpräparate von Bandwurmproglottiden.] [Permanent Preparations of Tapeworm Proglottides].—*Nachrichten d Tropischen Medizin* Tiflis 1928 Dec. Vol. 1 No 2. [In Georgian script. German summary p 228]

The washed flattened preparation is placed in Hofer's solution for 24 hours, washed for a few minutes in 50 per cent. and left for 2 to 4 days in 70 per cent. alcohol. It is then removed from between the slides which have kept it flattened and allowed to dry for some days. Picric acid crystallizes out in the uterine cavity and displays this from the genital opening to all branchings. The dried proglottis is then mounted in Canada balsam.

C L.

FAIRLEY (Keith D) The Intradermal Test in Hydatid Disease a Critical Analysis of its Results.—*Med J Australia* 1929 Apr 13 16th Year Vol 1 No 15 pp 472-483 [30 refs] [Walter & Eliza Hall Inst of Research, Melbourne.]

The technique was the injection intradermally of 0.3 to 0.4 cc. of pooled aseptic active hydatid fluid the needle being bevel upwards. a

few centimetres away a control injection of 0.85 per cent. saline was made. The wheal caused by an injection forms a white raised area like pignin about 1 cm. in diameter. The control rapidly fades. A positive reaction is immediate or deferred. When immediate the wheal increases in size usually with irregular processes and is surrounded by erythema; the maximum is reached in 20 minutes; it has faded in an hour. The delayed reaction appears locally usually some hours later as an indurated hot usually red swelling with a very definite edge; it has usually disappeared in 36 to 72 hours but may persist a week and may cover the whole limb but without glandular enlargement. Preoperative reactions in 35 persons with uncomplicated hydatids give an immediate reaction in 77 per cent. and a delayed one in 58. When cysts had ruptured or were suppurating these percentages were 92.6 and 26 in 27 cases. Of 87 persons showing immediate reaction there was proof of hydatid disease in 59.8 per cent. so that no one should be operated upon on this finding alone. When there is no history of recent urticaria, absence of immediate reaction definitely excludes a ruptured or suppurating cyst. Absence of a delayed reaction is valueless in excluding hydatid, but if associated with an immediate response and a high titre complement fixation or precipitation test, is frequent in the second week after operation, and in the absence of an operation implies rupture or suppuration. Reactions persisting ten years or more after operation demand careful scrutiny for further cysts.

C. L.

KELLAWAY (C. H.) *Anaphylactic Studies with Extracts of Hydatid Scoleces.*—*Brit. Jl. Experim. Path.* 1929 Apr. Vol. 10 No. 1 pp. 115-125. With 3 text figs. [11 refs.] [Walter & Eells Hall Inst. of Research, Melbourne]

Summary —

The general result of these experiments is to bring the hydatid scolex into line with other helminths, the tape-worm (Meyer) and the fluke (Kellaway). The substances in scolex which are insoluble in acetone but soluble in absolute alcohol and which act as partial antigens, causing sensitiveness but being unable to discharge it, may possibly owe their activity *in vivo* to union with some body protein in the guinea-pig producing a foreign complex to which antibody can be produced. There is, however, in addition a water-soluble substance present in saline extracts of scoleces which can function as an anaphylactic antigen. Owing to the difficulty of freeing scoleces from the protein substances in hydatid fluid it is not certain that this substance is not derived from hydatid fluid. Foetal boar (sheep) serum protein is present in extracts of scoleces and extraction with pure dry acetone and with absolute alcohol does not guarantee its absence from the resulting extracts."

C. L.

CARMALT JONES (D. W.) *Hydatid Disease as a Clinical Problem. Some New Zealand Experiences.*—*Brit. Med. Jl.* 1929 July 6 pp. 5-9 [10 refs.]

Although in New Zealand when dealing with obscure symptoms or signs the injunction is "think of hydatid," the total cases number only some 150 a year of which 7 or 8 come yearly to the Dunedin hospital and are distributed among as many medical men. Since deaths in non-suppurating cases were 6.3 per cent. and in suppurating cysts

52.7 per cent the importance of anticipating suppuration by operation is stressed. Recently devised tests such as the Casoni skin test complement fixation and improved skiagraphy have raised the rate of correct diagnosis from 40 to 80 per cent. Illustrative cases show how the patient's or the family history and the Casoni test may help and yet how the laboratory tests may mislead and extraction of fluid clinch the diagnosis.

C. L.

COUTELEN (F) Action *in vitro* des radiations ultra violettes sur le sable hydatique [Action of U V Rays in Vitro on Hydatid Sand].—*Ann Parasit Humains et Comparés* 1929 July 1 Vol. 7 No. 4 pp 274-279 [18 refs.]

With ultraviolet rays of an intensity which will kill staphylococci in 5 to 10 seconds the *coli* group in 18 to 19 seconds, *subtilis* in 45 seconds and the tubercle bacillus in a minute hydatid scolices show for an hour excited movements and are not all dead until after 2½ hours irradiation

C. L.

FAIRLEY (N Hamilton) & WRIGHT SMITH (R J) Hydatid Infestation (*Echinococcus granulosus*) in Sheep, Oxen and Pigs, with Special Reference to Daughter Cyst Formation.—*Jl Path & Bact* 1929 Apr Vol. 32. No. 2. pp 309-335 With 21 figs. on 11 plates (1 coloured) [29 refs.] [Walter & Eliza Hall Research Inst. Melbourne.]

This investigation deals with 11 257 sheep (16.5 per cent infected) 4,922 cattle (23.9 per cent infected) and 2 497 pigs (0.5 per cent infected)

The sheep constitutes the hygienically important intermediate host in Australia, because of the high incidence of infection the high percentage of fertility associated with high intracystic tension and a thick membrane and the frequency with which infected offal is fed to dogs. The high tension within the actively growing cyst causes it to enlarge irregularly where resistance is least (between such obstructions to expansion as vessels bile ducts and bronchi) so producing the multilocular type. The ratio of lung to liver site was 1.13 to 1 and of right to left lung 1.38 to 1. In 17 cysts were too numerous to count and in 14 so widespread as to suggest a blood-borne infestation. Degeneration was found in 13.57 per cent of 6 497 cysts and was higher in lung than liver daughter cysts were met with in 146 of these 117 exogenously and 29 endogenously. Of the former 70 per cent were healthy of the latter all were absolutely so with a fertile mother cyst, while with one partial exception the adventitia was equally normal.

In connexion with the suggestion based on observation in man that endogenous daughter cyst formation is defensive against inimical forces the authors urge that only in short lived hosts can the true early state of the mother cyst be observed their observations in sheep ox and pig conclusively show that in the food animals under review mother cysts containing single or multiple endogenous daughter cysts are intact fertile perfectly healthy contain fluid under normal tension and present stigmata of degeneration neither in the maternal cyst wall nor in the adventitia. The condition is the reverse degeneration in old mother cysts is secondary to increased cystic tension the result of growth of secretion of young endogenous daughter cysts

In the ox although 23.9 per cent. are infected, by far the commonest infection is with simple sterile unilocular cysts nearly always less than 2 in in diameter other types in order of frequency are unilocular fertile multilocular and multicystic. Multilocular cysts are fortunately much less common for if daughter cysts occur (they are nearly always exogenous) they have a high brood capsule content. The multicystic condition (the *Echinococcus multilocularis* of veterinarians) is regarded as caused by progressive early exogenous budding in the liver (it does not occur in the lung) before an adventitial barrier has formed. Degeneration is frequent in hepatic bovine cysts, but was found in in 16 per cent only of lung cysts, although 90.4 per cent. of lung cysts were sterile. Exogenous cysts specially considered in the ox, begin as nipple-like external projections into the pericystic space in one localized area. As they grow they separate the healthy mother cyst from the adventitia and indent the latter. Increasing tension leads to death and degeneration of either mother or daughters, usually of the mother cyst which is collapsed, central, degenerate and often folded.

In pig the multicystic form was absent and the multilocular rare. A distinctive feature is hyaline degeneration of the cyst membrane showing itself either as a blanchange-like mould of the whole cavity or as clusters of pseudo-daughter cysts within the laminated membrane and often bulging inwards like daughter cysts. "It was not until detailed microscopic study had revealed the constant absence of germinal membrane hydatid elements or indeed nuclear structures of any kind in the walls of these cysts that final proof of their essential nature was forthcoming. In man we have observed them in all stages including single isolated cysts, clusters, and finally honeycombing involving the whole thickness of the laminated layer." Failure to find other types of cyst with intracuticular origin leads the writers to the conclusion that "daughter cysts" so described are really due to hyaline cystic degeneration.

Regarding endogenous daughter cysts the only valid evidence is regarded as indicating their origin from living scolices and the authors support DÉVÉ in the conclusion that their most common source is vesiculation of a mature scolex.

C. L.

Dew (Harold). Secondary Echinococcosis.—*Jl College of Surgeons Australasia*. 1929 Mar Vol. 1 No. 3 pp. 337-350 (11th 8 text figs. 4 refs.)

This paper's essence lies in the following sentence "From these observations therefore emerges the fact that daughter cysts, brood capsules, scolices and germinal membrane can all, if shed into the tissues under aseptic conditions, implant and give rise to secondary cysts that may ultimately become fertile." The shedding may occur either into a visceral cavity—peritoneum, pleura or pericardium or into the circulation, venous comprising a peripheral vein or the right side of the heart or arterial comprising the left chambers of the heart. The clinical picture of a cardiac hydatid shows typically a primary cyst growing for 5 to 10 years, its anaphylactic rupture, 2 to 5 years' latency, signs of cysts in pericardium, lung or brain and lastly "a second intracardiac rupture of the now multivesicular original

cyst with as a rule anaphylactic shock and death from daughter cyst embolism of the cerebral vessels. Dew writes of the effect of injection of washed viable scolices into rabbits —

The vesicular change in the scolex is a relatively simple process. The scolex enlarges, becomes hydropic and the cells become spread out on the inner aspect of the cuticle which in turn rapidly thickens and becomes laminated. The only structures that persist, are the hooklets which are found aggregated in a confused mass at one pole but as the cyst grows they too become scattered and disappear. Striking features of the experiments which are also borne out by many clinical observations are the facts that although a great number of scolices may be set free in the tissues the resultant cysts are never very numerous, probably rarely more than 5 per cent. of the number of scolices and that of those that do survive many undergo degenerative changes comparatively early. There is no doubt that many are overwhelmed by the cellular reaction of the host and undergo phagocytosis and fibrosis.

C. L.

HASEGAWA (K.) Ueber die Widerstandsfähigkeit der reifen Larven der parasitären Nematoden [*Capacity for Resistance of Mature Larvae of Parasitic Nematodes.*]—*Taiwan Igakka Zasshi* (Jl Med Assoc Formosa) 1929 June No 291 pp 27-28 [Med. School, Taihoku.]

The author repeats experiments often made dealing with the action of chemical substances on larvae of hookworms, *strongyloides* and *trichostrongylus*. He claims however that larvae kept in 4 to 6 per cent salt solution for some days will yet revive in water but will not do so if left in the salt for a month or two. It is held too that larvae of *Ancylostoma* revive after 87 hours drying at 27° C to 32° C. *Trichostrongylus orientalis* after 53 days and *Strongyloides stercoralis* after 18 minutes.

C. L.

LANE (Clayton) MANSON BAHR (Philip) *The Mechanism of Filarial Periodicity*—*Lancet* 1929 June 22. pp 1291-1293 With 1 text fig [12 refs.] July 6 pp 45-47 [2 refs.]

In this stimulating and important paper the vexed question of filarial periodicity with special reference to *Filaria bancrofti* is dealt with. The old Mansonian view of a constant micro-filarial population sheltered during the day in the lungs and internal vessels and reaching the cutaneous capillaries only at night is rejected mainly on the grounds that no secret retreat in the viscera has been demonstrated during life while the embryos which have no means of fixation in the large blood vessels accumulate there only at or after death. The mechanical possibility of microfilariae being held back in the visceral capillaries is admitted but it is argued that the capillary bed could hardly be closed for one species (*F. loa*) and simultaneously in the same host be opened for another (*F. bancrofti* in India). An alternative hypothesis regarding periodicity is formulated. In it the author postulates simultaneous cyclical parturition so timed that microfilariae escape into the blood stream only at night time with daily death of the cyclic brood. Such an explanation was early explored by MANSON but rejected on the grounds that the act of

parturition was a continuous process and the filarial rate in the blood and urine did not correspond. Lane now reproduces an interesting graph based on MANSON'S original data and points out that, though direct evidence of cyclic parturition is scanty certain observations, such as those of MANSON BAHK on the longevity of embryos *in vitro*, and their sudden disappearance following febrile attacks in certain cases support his hypothesis. The daily disposal of embryos by solution in the blood-stream and visceral filtration with destruction of embryos in the kidney spleen and liver is discussed, and biological support is adduced from facts concerning the different insect vectors. An optimum insect host and an unspecialized method of parturition are regarded as the original existing types and such is found in Fiji where non-periodicity exists and *A. pseudoscutellaris* is the vector. *C. latigans* is known to be many times less susceptible than *A. pseudoscutellaris* and it is pointed out that with the former host if the female worm could juggle with the short lived microfilariae by varying the rate of parturition so as to circulate embryos cyclically in the peripheral blood during the few hours when this mosquito bites, then the worm species would survive despite an inefficient intermediary. The author however does not regard periodicity as a mere adaptation to the feeding habits of a particular vector rather is it an adjustment producing that mean between failure to infect an insect and liability to kill it by hyperinfection which reasonably subserves the survival of the parasitic species.

Manson Bahr reviews at considerable length LANE'S theory of simultaneous cyclical parturition with daily destruction of microfilariae and concludes that there is nothing unbiological in the idea that female filariae have cyclical and well defined periods for emptying the uterus of imprisoned ova. LANE credits *F. bancrofti* with extensive power of fecundity. In conjunction with Dr W. K. BLACKIE, the author estimated the amount of blood contained in the peripheral circulation of an adult man of given height weight, and surface area to be 253 cc. Previous work in Fiji had shown that over 500 embryos were often present in 20 cc of blood and on this basis the vessels contained in the skin and subcutaneous tissue to a depth of mm. were calculated to harbour over 8 575 000 microfilariae. Not more than 20 adult filariae are found at autopsy and in terms of LANE'S hypothesis this would necessitate the daily production of 325,000 embryos per female. The author doubts if any comparative figures on the reproductive capacity in nematodes are available, and also points out that the pathological lesions which should accompany the daily destruction of such myriads of embryos have not been met with.

The survival time of embryos in man is a crucial point in the hypothesis and the pertinent suggestion is made of injecting a volunteer with adequate quantities of *M. bancrofti* under conditions similar to FULLERON'S experiment with *M. repens* in the dog. The author next seeks to fit in certain known facts with cyclic parturition and the different habitats possessed by the two varieties of *F. bancrofti* are considered. In nocturnal *F. bancrofti* the adult worms have a central location chyluria from obstruction of a main lymphatic trunk being a common complication. The non-periodic *F. bancrofti* of Oceania shows a peripheral habitat in lymph glands and filarial adenitis and elephantiasis are typical complications. Clinically individuals with the highest microfilarial count show fewest signs of disease a finding

dependent on the uninterrupted passage of embryos into the blood stream. Microfilariae in the lymph glands must pursue a more complicated route and would reach the blood stream by a constant trickle both day and night—hence non periodicity!

Problems connected with *F loa* and inversion of periodicity by alteration in sleeping habits are also dealt with and the author urges a reconsideration of the whole mechanism of periodicity on a wider scale by carefully weighing all the evidence not only regarding *F bancrofti* but other human species as well.

[Serological evidence of massive daily destruction of microfilariae might also be sought for. Circulatory antibody could hardly be absent in the presence of so intense an antigenic stimulus as the one postulated in LANE'S hypothesis.]

N Hamilton Fairley

O'CONNOR (F. W.) & BURKE (G. R.) **Lymphangitis and Filariasis in Porto Rico. A Report of 57 Cases.**—*Amer J Trop Med* 1929 May Vol. 9 No. 3. pp 143-177 [Presbyterian Hosp San Juan Porto Rico]

The authors give descriptions of 47 women and 10 men of whom 17 suffered from lymphangitis without elephantiasis while in the rest the latter was present. Blood examinations (20 cmm. drawn at night) were made in 31 only two containing microfilariae. For lymphangitis an exciting cause was mostly absent pain was commonly the first symptom and the condition most commonly showed itself as a small red erythematous patch from which red lines spread up and down the limb. Many experienced recurrences monthly while in three persons who temporarily left Porto Rico these occurrences ceased during absence from the endemic area but re-appeared on return to it. On two the Kondoleon operation had been performed one had no benefit and in the other benefit was temporary.

C. L.

WATANABE (K.) [Klinische und histopathologische Beobachtungen über die Filarialymphangitis des Samenstrangs und über das Lymphom der Inguinofemoraldrüse insbesondere über die Entstehung der lymphatischen Reaktion und des Sekundärknötchens bei Filariasis.] [**Filarial Lymphangitis of the Spermatocord.**]—*Japan J Dermat & Urol* 1929 Jan. Vol. 29 No. 1 pp 1-30 With 15 text figs [133 refs] [In Japanese German summary pp 1-7] [Dermat Urolog Clinic, Univ Nagasaki]

Seven cases are described in which spontaneously or after exercise there appeared, nearly always without fever hydrocele and a swelling of the cord unattached to the vas deferens or of the head of the epididymis and incorporated with it. In six cases the nodule and epididymis were excised. The essential features were dilatation of lymph vessels which contained filarial and amorphous detritus with fragmented nuclei eosinophils and endothelial cells. The vessel walls were thickened and surrounded by the same cells mast and plasma cells and a few fibroblasts. There was held to be a new

formation of lymph gland tissue. In another case two cysts were removed from the groin containing filariae and with secondary lymph glands in their wall. It is concluded that lymphatic reaction and secondary lymph gland formation are essential to immunity against filaria. In all cases but one microfilariae were present in the blood.

C. L.

CHOPRA (R. N.) & RAO (S. Sundar) *Studies in the Treatment of Filariasis*.—*Indian Med Gaz.* 1929 Mar Vol. 64 No. 3 pp 130-139 With 2 graphs in text [6 refs.]

The authors emphasize the finding that the microfilarial content of the blood varies very greatly apart from treatment and give the numbers found in 6 cases presumably in a fixed quantity of blood. Allowing for this variation no parasitocidal effect could be detected from the use of bisnene, antimosan stibosan, neo-stibosan, stiburea, novostiburea, antimony sulphur compound, mercurochrome plasmo-chin, emetine or tryparsamide though the last produced disappearance of chyluria and decreased the frequency of lymphangitic attacks. This sentence occurs: "In chronic filarial lymphangitis the abdominal glands are usually affected the microfilariae do not get into the blood-stream and remain confined to the lymphatics. Many of the parasites subsequently introduced by the mosquito do not mature those that mature lay embryos which work back, cause slight lymphatic obstruction and become secondarily infected."

C. L.

CHRISTOPHERSON (J. B.) *The Radioscopic Diagnosis of Filariasis*.—*Brit Med J* 1929 May 4 p 808.

A missionary of 62, who had in his early years of work spent 14 years in which he had frequently been bitten by bugs and mosquitoes without ever suffering from malaria, and who had recently been looking after a leper began to feel the right leg heavy to move as if it did not belong to him. It was $1\frac{1}{2}$ inches larger than the left in the calf and in the thigh. There was eosinophilia of 5 to 9 per cent. Blood and faeces gave no direct evidence of worm infection. X rays showed in the right calf and thigh, and nowhere else two or three small oblong cyst-like objects tapering to one end, the shadow $\frac{1}{2}$ in. long, the thick end being lighter.

C. L.

DELBANCO (E.) MOHLERS (P.) & VOGEL (H.) *Bancrofti Invasion mit Chyloroele und Periorchitis*. [Case of Filariasis with Chyloroele and Periorchitis].—*Arch f Schiff's u Trop Hyg* 1929 Apr Vol. 33 No. 4 pp 193-197 With 7 text figs. [Inst. for Ship & Trop. Diseases, Hamburg]

A negro from Liberia presented an elastic, non-fluctuating, translucent, painless swelling of a testis. Puncture showed a milky fluid with numerous active microfilariae, lymphocytes, red corpuscles and very fine fat particles. The testis, including epididymis, tunica and a length of cord was excised. The last contained a yellowish lymph varix, the hydrocele 30 cc. of chylous albuminous fluid but no adults nor did the varix do so, though two pairs of *F. bancrofti* were found in a small lymphatic vessel in the tunica. This in places was 3 to 6 mm. thick and contained vessels with thickened walls, round cell infiltration and growth of endothelial cells which took on a giant character. There was no local eosinophilia.

C. L.

VINCENZO (Jura) La filarionei in Italia. Un caso di chiluria da *Filaria Bancrofti*. [Case of *F. bancrofti* Chyluria in Italy].—*Polichinico Sez. Prat.* 1929 June 10 Vol 36 No 23 pp 806-808 With 1 text fig

No microfilariae were detected in the urine of a man with haemochyluria. Numerous examinations of the circulating blood during sleep displayed on an unstated number of occasions *Mf. bancrofti* which remained mobile for 10 to 15 seconds after being drawn, were as many as 10 to 15 in a single microscopic field of the diameter of a red corpuscle 25 to 40 times as long as broad and the rounded head possessed a rostrum. Vital staining showed a clear external zone and within numerous granules interspersed with 5 clear or blurred spots. When the urine was filtered immediately after being passed similar bodies were found [presumably in the filtrate]. A photomicrograph is not convincing

C. L.

NEUBER (Eduard) *Filaria sanguinis hominis (Filaria bancrofti)* Vorläufige Mitteilung [Case of *Filaria bancrofti* Infection].—*Wiener Klin Woch* 1929 July 11 Vol. 42. No 28 pp 937-938

A man of 57 inhabitant of north Hungary had during the war been stationed in Bohemia, and had never been elsewhere. He developed fever with rigors and ended up with an elephantoid scrotum. Larvae of *Filaria bancrofti* were found in the blood sheathed, 300 μ long, with sinuous movements and having a central core of nuclei

C. L.

CORT (W. W.) OTTO (G. F.) & SPINDLER (L. A.) Studies on Ascariasis in Virginia. A Preliminary Report.—*Southern Med J* 1929 July Vol. 22. No 7 pp 608-613 [5 refs.] [School of Hyg & Public Health Johns Hopkins Univ Baltimore]

Distribution and intensity of infection were measured by Stoll's egg counting method, the degree of visible soil pollution by inspection and the amount of ascaris infection of the soil by indirect centrifugal floatation in a solution with a specific gravity of 1350 (obtained by bichromate of soda solution) the surface being then examined as in the Kofoid and Barber technique. There was no racial difference between whites and negroes in the distribution of infection which was definitely familial. The writers definitely speak of ascaris families and from the soil about their houses or more frequently under them when they were raised at one end from the sloping hillside, ascaris eggs often embryonated were commonly found. Under these houses the younger children commonly played, it was the younger children under school age who were commonly or even solely infected, and it was they who did not use the latrines either because of the difficulty of climbing on to the seat or of the fear of falling through the hole when they did. Indeed this seems a very justifiable fear in view of FLANNAGAN'S statement in discussion that children he was told, had been drowned in septic privies. At least in present local conditions these children are the main source of infection. Recommendations include a children's hole and school education which may in the next generation be as effective in securing its object as it has been in the past in obtaining prohibition in America.

C. L.

BORCHARDT (W.) Zur mutmasslichen Genese der Eosinophilie bei Ascarisinfektion und evtl. auch bei anderen Wurmkrankheiten. I Mitteilung Die Wirkung von aliphatischen Aldehyden. [The Probable Origin of Eosinophilia in Ascaris Infection.]—*Arch. Hyg.* 1929 Mar 28 Vol. 8 No 13 pp 591-594. [3 refs. (Inst. for Ship & Trop Diseases, Hamburg)]

FLURY (*Arch f exper Path* 1912, Vol. 67 p. 275) stated that aldehydes of the fatty acids were found in ascaris. Borchardt injected these substances into cats and found that in small doses they produced eosinophilia (except acetaldehyde) and in larger doses an increase in polymorpha. The other compounds used were propylaldehyde, crotonaldehyde formaldehyde, isobutyraldehyde and isovalerylaldehyde.

C. L.

SCHWEIZERISCHE MEDIZINISCHE WOCHENSCHRIFT 1929 May 11 No 19 pp 483-494 Enquête ueber Pathogenität und Verbreitung der Ascariden in der Schweiz. Die Bedeutung der Spulwürmer in der menschlichen Pathologie [ASKANAZI]. Technik der Gewinnung und mikroskopischen Untersuchung von Helminthen Eier und Larven [GALLI VALERIO]. [Ascaris Infestation in Switzerland. Examination for Ova.]

ASKANAZI describes various ill-effects which ascaris has produced either a. adult or larva. Galli-Valerio describes microscopic diagnosis either by 5 covered preparations of a faecal suspension in water or in 1 to 2 per cent formalin solution, or by floatation in 37.5 per cent salt solution in an Erlenmeyer flask for 5 to 45 minutes and examination of the surface layer. Lettuce leaves are cut up small, soaked in water then sedimented by gravity for 15 to 20 minutes and the sediment examined. It is necessary to examine 40 or 50 preparations before a negative conclusion can be accepted. [In the abstracter's counts floatation in an Erlenmeyer flask has delivered on the average 9 per cent of hookworm ova placed within it. The present statements are uncontrolled]

C. L.

BOTTIGER (Carl) & WERNER (Jacob) *Ascaris lumbricoides* found in the Cavity of the Human Heart.—*Jl Amer Med Assoc* 1929 July 6 Vol 83 No 1 p 32 [St. John's Long Island City Hosp., Long Island City]

A woman with ulcerated elephantiasis, and an acute illness of a few hours' duration showed post mortem pulmonary thrombosis and chronic interstitial pneumonia. The interesting feature of this case was the finding of two yellowish white worms with annular markings measuring each about 10 cm by 6 mm in the cavity of the right ventricle. No adult forms of the parasite were found in the intestine. The worms were identified as forms of *Ascaris lumbricoides*. [An expert's identification of these annulated bodies will be awaited with interest.]

C. L.

DICKS-DILLY (J) Deux cas de néphrite par ascaris dont un suivi de mort. [Two Cases of Ascaris Nephritis, One Fatal.]—*Ga. Acad Sci Méd de Bordeaux* 1929 Mar 24 Vol 50 No 12 pp 186-187

The fatal case a recruit, weighed only 47.5 kilos had erythema, fever vomiting, right hypochondriac pain suggesting appendicitis and more vomiting with passage of four ascarids. Thymol administered had apparently no vermifugal effect, melaena and arthritis appeared and in the third week albuminuria and later casts. Ascaris and trichuris eggs persisted and he died with evidence of intense toxæmia. No autopsy is mentioned. The second, also a soldier had oedema and urine with albumin and a specific gravity of 1011. Ascaris and trichuris eggs were present, but were no longer formed after chenopodium. The nephritis was not, however cured. The writer answers in the positive the question he puts. Is there ascaris nephritis?

C. L.

DSCHAPARIDZE (P) [Ein Fall der starken Askarideninvasion mit schweren klinischen Erscheinungen.] [Case of Ascariasis with Severe Clinical Symptoms.]—*Nachrichten d Tropischen Medizin* Tiflis 1928 Dec. Vol. 1 No 2. [In Georgian script German summary p 225]

A girl of 16 had ailed for three years with weakness pain in the head and abdomen, loss of memory and sleeplessness. Latterly she had been bed ridden with weakness. Anaemia was marked and unrelieved by quinine. Eggs of ascaris oxyuris and trichuris were present. Santonin caused a week long exodus of ascaris by mouth and anus she left her bed in a fortnight, and was fully recovered in three months.

C. L.

DIXON (M B Duncan) A Case of Sudden Death due to the Occlusion of the Larynx by Two *Ascaris lumbricoides*—*Edinburgh Med Jl* 1929 Feb Vol 96 No 2 p 111

A negro girl of 8½ years died within four or five minutes of leaving her mother well. Two large ascarids completely occluded the larynx, one being partly curled up in it. Another ascaris lay in the stomach and two more in the small intestine. There were the usual bodily signs of asphyxia. It is suggested that increased respiration (she was carrying water back from a well) caused inspiration of worms which had reached the pharynx.

C. L.

STOLL (Henry F) Trichinosis. Report of Two Cases presenting Diplopia and Ona, Polyserositis.—*Jl Amer Med Assoc* 1929 Mar 9 Vol 92 No 10 pp 791-793 With 2 text figs [8 refs] [Hartford Hosp Hartford, Conn.]

In the first two cases ocular symptoms (extreme conjunctival oedema, diplopia) accompanied a marked eosinophilia. Excised portions of deltoid and trapezius showed trichinella larvae of which photographs are shown. The third patient developed pleurisy and pericarditis and showed eosinophilia of 21 to 31 per cent and a precipitin reaction with 1 in 4 000 serum dilution but no trichinae were found in excised trapezius. It is considered possible that infection had occurred on an occasion 18 years earlier when he had had pain in the legs and thighs so severe that he took ¾ of an hour to get to the telephone and back down two

flights of stairs, to summon a Christian Science healer. The pain however lasted several weeks under his treatment and, most inopportunistically, recurred several months later when the patient was acting as usher at a Christian Science meeting, and was so severe that in the middle of the lecture he had to lie down on the floor.

C. L.

DE LANGEN (C. D.) Anguilluloids and the Syndrome of the "Idiopathic Eosinophilia. — *Meded. Dissert. d. Volksgeneesk. Acad. in Nederl. Indië* 1928. Vol. 17. Pt. 4. pp. 515-529 [Dept. of Internal Diseases, Med. Univ., Batavia.]

In 1923 de Langen published 3 cases of "idiopathic eosinophilia." These are briefly redescribed [see this *Bulletin* Vol. 21 p. 499] and sixteen others are added. These cases gave a history of 4 months to ten years illness, and showed a leucocytosis with eosinophils as high as 85 per cent and a syndrome of slight anaemia, epigastric pain and heaviness, intermittent diarrhoea, slight rises in temperature and pulmonary symptoms—cough, mucopurulent expectoration an asthmatic condition and broncho-pneumonic foci shown scattered through the lungs under X-rays. No tubercle bacilli were found in spite of daily examination for weeks. Strongyloides infection was considered as a cause, the sputum examined, and finally we succeeded in finding therein a few larvae. Accordingly regular examinations were made of the faeces of an unstated number of persons and Strongyloides larvae were found in 26 by smear or by culture for 24 hours with subsequent extraction by Baermann's method. In this group of twenty six were found 12 of the 16 hypereosinophilias already mentioned the other persons were in hospital for other causes and had eosinophilia varying from 3 to 29. Treatment was undertaken by tartar emetic intravenously which cleared up the general condition but left a fair intestinal infection. Accordingly gentian violet by mouth 0.1 to 0.3 gm. three to five times daily was added. Although an occasional larva could sometimes still be found, the morbid symptoms and eosinophilia disappeared in a most striking way. [The X-ray condition of the lungs after clinical cure seems nowhere stated. The findings suggest a pulmonary habitat for a proportion of the parthenogenetic forms.]

C. L.

ST JOHN (Joe H.) SIMMONS (James S.) & GARDNER (Leon L.) Infection of the Lung by a Hematode of the Genus *Cyathostoma*. — *Jl Amer Med Assoc* 1929. June 1. Vol. 92. No. 22. pp. 1816-1818. With 3 text figs. [2 refs.] [U.S. Army Med. Dept. Research Board, Bureau of Science Manila, P.I.]

Three days after returning to Manila from a climbing expedition, a man developed acute bronchitis, passing into a chronic illness with paroxysmal cough, asthma, mucopurulent sputum often streaked with bright blood, pain and tenderness on palpation and percussion in the first left intercostal space 1 m. from the sternum. The sputum showed colourless thin-shelled ova 102 μ by 60 μ , oval and generally flattened on one side and containing 8 cells and therefore fertile. An eosinophilia

varied from 7 to 28 per cent. Treatment was unavailing but one day a moderate attack of coughing expelled a blood-red female nematode, 16.6 mm. long. The oral cavity contained at its base seven teeth and a fleshy tooth like projection which probably carried a glandular duct. The vulva lay 3.52 mm. from the head. [The description of the internal organs does not seem to show specialist knowledge. *Gnathostoma* E. Blanchard, 1849 is a synonym of *Syngamus* Siebold, 1836.]

C. L.

HEYDON (G. M.) Creeping Eruption or Larva Migrans in North Queensland and a Note on the Worm *Gnathostoma spinigerum* (Owen) — *Med J Australia* 1929 May 4 16th Year Vol. 1 No 18 pp 583-591 [19 refs.] [Australian Inst of Trop Med. Townsville]

Oestrid larvae, immature gnathostomes and as CILENTO has shown for Rabaul [this *Bulletin* Vol. 25 p 290] the mite *Rhizoglyphus* cause creeping eruption as well as nematode larvae. The last cause is not uncommon about Townsville in the wet hot summer in those who go barefoot either to the sea, or to the shower bath beneath the pile-raised houses where the ground is slightly moist and a resort of dogs and cats. These animals are nearly always infected with *Ancylostoma caninum* and *A. braziliense* as many as 552 hookworms having been found in one cat. Experimental infections in man produced in some cases creeping eruption and that with larvae both of *A. caninum* and *A. braziliense* but in no case did D.C.F. show subsequent intestinal infection. Larvae of *Trichostrongylus colubriformis* produced no local effect on the skin and no infection of the bowel. The itchiness accompanying a creeping eruption is often [as LOOSS pointed out in his own person] localized to a point a few millimetres beyond the advancing end of a track and gives the impression of something moving but Heydon adds the observation that close inspection of such a spot will sometimes reveal a tiny elevation and that the track is really continuous right up to it though for the last few millimetres it is only a very inconspicuous mark in the epidermis.

In view of FERGUSON'S statement [loc. cit. Vol. 25 p 700 G. R. HAMILTON] that he knew of no record of gnathostomes in Australia Heydon reports the not infrequent finding of *G. hispidum* in Rabaul in the stomachs of pigs largely of the kanaka breed with some admixture of imported stock. He also found *G. spinigerum* in a cyst in the stomach wall of 1 of about 40 cats examined. It contained 19 males and 30 females. The lumen of cyst stomach and rectum contained eggs in numbers more or less equal to those derived from 227 hookworms also present. These eggs were nearly all one-celled, some two-celled. It thus appears that the intra uterine embryonated eggs reported by CLAYTON LANE from the Calcutta cat possibly arose from the examination of worms preserved in a manner which allowed the eggs to continue their development [the interval between the host's death and the worm's preservation was however unknown.] Development occurred well at summer room temperature, but that of 37° C. delayed or prevented development, or killed eggs. Spontaneous hatching is very rare. Newly hatched larvae 0.25 mm. long lie in a voluminous unstriated delicate sheath.

C. L.

CAUCHEMER (L.) Un cas remarquable d'appendicite à oxyures. [Remarkable Case of Appendicitis with Oxyurias.]—*Ann. Parasit. Humains et Comparés* 1929 July 1 Vol. 7 No. 4 pp. 230-231 With 4 figs. on 2 plates. [Lab. of Parasit., Faculty of Med., Paris.]

An inflamed adherent appendix removed from a child of 8, showed on section numerous portions of enterobius lying within the mucosa and in the lumen. There had before operation been nothing to suggest that the child was parasitized with threadworm.

C. L.

SCHULTZ (Richard Ed.) *Trichostrongylus orientalis* (Jimbo 1914) als Parasit des Stachelschwanzes. [*Trichostrongylus orientalis* as Parasite of Porcupine.]—*Rev. Microbiol. Epidemiol. et Parasit.* 1929 Vol. 8 No. 1 pp. 45-48. (11 refs.) [In Russian. German summary pp. 115-116.]

The porcupine is implicated as a "reservoir host" of *Trichostrongylus orientalis*.

C. L.

BOLETIN DEL INSTITUTO DE CLÍNICA QUIRÚRGICA. Buenos Aires. 1927 Vol. 3 Nos. 21-25 pp. 147-191.—II. Uncinariasis. Uncinariasis. Also issued as 3a Reunión Soc. Argentina Patol. Regional del Norte Tucumán Julio 7 8 y 10 1927 pp. 39-83.]

In Section II of the report of the Third Session of the Sociedad de Patología Regional del Norte are contained eight articles treating of helminthic problems. Two of a more strictly scientific character from the helminthological aspect are by Drs. SORER and VOGELSKO, the first comparing *A. duodenale* and *A. americanus* from the point of view of oviposition, the second comparing and differentiating *A. brasiliense* and *A. caninum*. By calculations based, unfortunately on a very small number of cases Dr. SORER found that the daily output of *A. duodenale* was from two to two and a half that of *Necator* and the range of variation practically the same. He concluded that the variation was not the result of treatment, but was probably a specific peculiarity or due to cyclical production of ova [see this Bulletin, Vol. 4 p. 1008].

The differences relied upon by Dr. VOGELSKO for distinguishing *A. brasiliense* from *A. caninum* were a well-marked triangular tooth on each side of the buccal capsule and a pair of accessory teeth at the anterior superior angle in the latter. In a dog dying in Tabacal (Salta) nine specimens of *A. caninum* were found and three of *A. brasiliense* while in another at San Pedro (Jujuy) only the former were present.

The succeeding four papers are of an epidemiological character. The first is a study of the infection in the Departments of San Pedro and Ledesma. Of 233 school-children examined 22.31 per cent. were found infected (no details of technique). The figures obtained at the six different schools are not of much value because the numbers are so small—at none were more than 45 examined and at one only twenty. Further investigations are recorded in another article dealing with San Pedro where infection is both severe and widespread. In some parts, Corrientes for example the percentage was 60 and even higher. There the people were living under very primitive and unhealthy

conditions in adobe huts with an earth floor no latrines, and the dwellings occupied also by several animals. Most of the inhabitants showed obvious signs of infection—pallor oedema, wasting of muscles palpitation languor and general debility. In many the erythrocyte count was down to a million and the haemoglobin to 25 per cent or less. Mass treatment is being undertaken.

The western part of the city of Tucumán was also found to be an endemic focus. The general appearance of many individuals was suggestive of the disease and of 70 whose faeces were examined 42 proved positive. In the Northern Argentine again infection is heavy thus at Chaco 30 leagues west of Concepción every one examined [the number is not stated] was found to be harbouring *A. duodenale* and 50 per cent of them had *N. americanus*. The relative proportion of the worms was 13 to 1.

The last two papers are concerned with anthelmintic plants. Several of these or at least plants having such reputation are indigenous to the country. The following are the chief *Aspidium capense* having an action similar to that of Filix mas *Ficus anthelmintica* *F. cestriifolia* *Carica papaya* *Jaracata dodecaphylla* and finally two varieties of *Chenopodium*, *C. ambrosioides* and *C. anthelminticum*.

H. Harold Scott

GARIN (Ch.) DOUBROW & MOUNIER. Sur la possibilité de développement des larves dans l'utérus de la femelle morte d'ankylostome. Conséquences thérapeutiques et prophylactiques. [Development of Larvae in Uterus of Dead Female Ankylostome]—*Lyon Méd* 1928 June 3 Vol. 141 No. 23 pp 634-635 With 4 figs on 1 plate.

When female hookworms are washed in saline and kept at a warm temperature for 24 hours numerous larvae develop and feed upon the internal organs. The authors think that a similar development may be probable in the human body and deduce therefrom the possible invasion of the intestinal mucosa by the infective larvae. This would afford an explanation of the difficulties which are sometimes encountered in the eradication of hookworm infestations. [It is stated that this phenomenon has only been noticed previously by ALESSANDRINI but it is a common technique for the cultivation of pure strains of larvae of burrhead nematodes in agricultural parasitology.]

R. T. L.

CHANDLER (Asa C.) The Rates of Loss and Acquisition of Hookworms. —*Jl Amer Med Assoc* 1929 Apr 20 Vol. 92 No. 16 pp 1337-1341 With 2 charts in text. [13 refs.]

Chandler considers the evidence which has been offered regarding the rate at which hookworm infection is got and lost particularly with reference to Indian work, that of MHASKAR (*Indian Jl Med Res* Vol. 8 p 398) and himself (this *Bulletin* Vol. 23 p 773). While the degree of infection in an Indian jail had lessened by 92 per cent. in 5 years, the number of infected persons had not. Diagnosis was in this case by the Kofoid and Barber technique and the counts of eggs by Chandler's modification of Stoll's technique. Further detailed studies are urged.

C. L.

VILLELA (Gilberto G) & TEIXEIRA (J. Castro). [In Portuguese & English.] Exame do sangue na anemia helmintica. Blood Study in Hookworm Anemia.—*Inst. Oswaldo Cruz. Supplemento das Memorias*. 1929 Mar. No. 6. In Portuguese pp. 53-61. In English pp. 62-68. [11 refs.]

Very few biochemical observations have been made on the blood serum in hookworm disease. In patients with ankylostomiasis studied in Rio de Janeiro it was found that the blood serum calcium was normal or reduced, while the potassium content was generally low (16.5 to 22 mgm. per 100 cc. of serum) possibly as a result of the fall in the number of red cells. The chlorides were increased, the total protein content reduced and the cholesterol normal in amount. Anthelmintic treatment was followed by a return to the normal in all the blood constituents studied.

G. M. Findlay

SCOTT (J. Allen). Experimental Demonstration of a Strain of the Dog Hookworm, *Ancylostoma caninum* especially adapted to the Cat.—*Jl Parasit* 1929 Mar. Vol. 15 No. 3. pp. 209-213. [19 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ. Baltimore Md.]

The author reviews the varying relative parasitization of dogs and cats with *Ancylostoma caninum* in various parts of the world, and notes that in certain places it is absent from cats though common in dogs. Accordingly he has undertaken experiments with two strains, one from dog and one from cat. All host animals were kept long enough to eliminate previous immature infections and all were found negative by D C F. "This method will indicate the presence of a single mature [fertilized] female. Larvae from charcoal cultures were given orally in gelatin capsules, which practically eliminated any tendency to vomit, to pups and kittens kept in individual cages, controls kept in identical conditions remaining uniformly uninfected. When cat strain was fed to kittens 45 per cent. of larvae matured, when to pups 0.4 per cent. Conversely when dog strain was fed to pups 50 per cent. matured, when to kittens 4.6 per cent. There is doubt regarding the last number since this kitten had to be returned to a single cage for two days and the control, while showing no adult hookworms, showed 28 undeveloped larvae to Baermann's larval extraction apparatus. It is concluded that the experiments demonstrate two strains of a parasite morphologically identical but physiologically different in their adaptation to different hosts.

[It would be valuable to obtain information as to any effect on dermal infection of such host influence.]

C. L.

YOKOGAWA (S.) [Occurrence of *Ancylostoma brasiliense* Gomes de Faria in the Aborigines of Formosa and in their Cat.]—*Teikoku Igakka Zasshi* (*Jl Med Assoc Formosa*) 1929 May No. 290. [In Japanese. English summary p. 23.]

Ancylostoma brasiliense was found in a cat caught in a mountain district of N. Formosa. The aborigines could not be induced to undergo anthelmintic treatment. Faeces from them were cultured and fed to a cat in

whom later an adult female of this species was found. No mention is made of efforts to prove that the cat was originally free of infection or did not become naturally infected later

C. L.

DZCHAPARIDSE (P) [Hakenwurmkrankheit in Abchasien und ihre Bekämpfung] [Hookworm Disease in Abkhazia and its Prevention.]—*Nachrichten d Tropischen Medizin* Tiflis 1928 Vol. 1 No 1 [In Georgian script. German summary p 112.]

By diagnostic methods unstated in the German abstract it is concluded that 75 per cent. of children suffer from ankylostomiasis. *Necator americanus* being the predominant hookworm. Mass treatment with thymol was carried through

C. L.

FRANCHINI (G) & BACCHELLI (G) Su di un focolaio di Anchylostomoidemia in Provincia di Modena. [Ankylostomiasis in Modena.]—*Arch Ital Sci Med Colon* 1929 Feb 1 Vol 10 No 2. pp 53-58 With 2 text figs. English summary p 58 [Inst. of Trop Path. Univ Bologna.]

A young man of 17 years came to the medical clinic of Modena. He was anaemic and his blood contained 13 per cent. eosinophiles. Faecal examination revealed ankylostome ova. Further examination of his parents, two brothers, and two sisters proved that the whole family was infected

H. Harold Scott.

KARIBOFF (N) [Données préliminaires sur l'invasion vermineuse dans quelques groupes de la population de Tiflis]—*Russian J Trop Med* 1929 Vol. 7 No 1 pp 45-46 [In Russian.]

KIRBY SMITH (J L) DOVE (W E) & WHITE (G F) Some Observations on Creeping Eruption.—*Amer J Trop Med* 1929 May Vol. 9 No. 3 pp 179-192. With 1 plate. [11 refs.]

MARIA MACERA (Jose) & CARREÑO (Carlos) La entozoosis en clinica pediatrica.—*Cronica Med. Quirurg de la Habana* 1929 Feb Vol. 55 No. 2 pp 81-88.

NICHOLSON (Daniel) Variations in the Fish Larvae of *Diphyllbothrium latum*—*Canadian Public Health J* 1929 Apr Vol. 20 No 4 pp 193-195 With 1 text fig. [1 ref.]

SCHRIEDER (K. L.) PODYAPOLSKAYA (V. P.) & SCHOUTZ (R. S.) [L'oeuvre de la 60-me expédition helminthologique en l'Extrême Orient Sibérien.]—*Russian J Trop Med* 1929 Vol. 7 No 1 pp 36-44 [In Russian.]

STUNKARD (H. W.) Observations nouvelles sur les trématodes sanguicoles du genre *Parasitum* (*Spirorchidae*) avec description des deux espèces nouvelles.—*Ann Parasit Humains et Comparés* 1928 July Vol. 6 No 3 pp 303-320 With 9 text figs. [10 refs.]

STUNKARD (Horace W.) The Parasitic Worms collected by the American Museum of Natural History Expedition to the Belgian Congo 1909-1914 Part I.—Trematoda.—Reprinted from *Bull American Museum Natural History* 1929 Apr 15 Vol. 58. Art. 6 pp 233-289 With 37 figs.

WARNOWSKY (I.) Ueber endemische Infektion durch *Trichocephalus dispar* im Memegebiet und Gross-Litauen.—*Muench Med Woch* 1929 July 12. Vol. 78 No 28 p 1171

ZORODOWSKI (P) Ankylostomose.—Institut de Microbiologie et d'Hygiène d'Azerbaidjan, Bakou. 1929 60 pp [In Russian.] With 1 map & 3 plates.

YELLOW FEVER.

PUBLIC HEALTH REPORTS. 1929 July 12. Vol. 44 No. 23.
pp. 1657-1659 [2 refs.]—Yellow Fever at Rio de Janeiro.

During 1928 yellow fever reappeared at Rio de Janeiro [*etc.*, p. 294] and up to October 6th, 119 cases were reported with 66 deaths. From that date until January 12th, 1929 there were only 7 cases, with 4 deaths but beginning in January the prevalence increased and up to June 1st 1929 there have been reported 615 cases, with 351 deaths. The results indicate that the yellow fever curve rises during the summer months when conditions are most favourable for the life and multiplication of the mosquitoes. The present outbreak extended to all parts of the city from the dense rural zones out to remote suburbs consequently the difficulty of anti-mosquito measures was much increased. About 6,000 men a day are being employed in the campaign against mosquitoes. In addition to the destruction of larvae, more than 400 houses a day are being disinfected by sulphur or insecticides. The most commonly used insecticide is a mixture of petroleum, carbon tetrachloride and pyrethrum. In addition, all cases are isolated and a careful sanitary supervision is made of the sections where any have occurred, following the radius of action of the mosquito carrier.

E. Hindle

HANSON (Henry) Observations on the Age and Sex Incidence of Deaths and Recoveries in the Yellow Fever Epidemic in the Department of Lambayeque, Peru, in 1921.—*Amer J Trop Med* 1929 July Vol 9 No 4 pp 233-239

An interesting account of the last yellow fever epidemic in Peru in 1921. A list is given of the age and sex of 478 cases of the disease which clearly shows that infants of 1 and 2 years old are particularly susceptible and that the great majority of the cases occurred in people under 30 years of age. The explanation given is the fact that the last epidemic in Peru was 25 years previously and consequently the majority of the population above this age is immune. The records show that practically every patient more than 25 years old entered Peru after the previous epidemic.

The highest death rates occur among infants especially those between 1 and 3 years of age, and in persons of 5 years or older the lowest death rate is between 11 and 15 years. The death rate in males is 2.3 per cent higher than in females [but the figures are not large enough to be of significance]. Deaths are recorded on the 2nd to the 24th days of illness, but the majority occurred on the 6th day which seems to be the day of crisis.

[The author's observations as to the susceptibility of infants are opposed to the view sometimes advanced, that the disease is maintained in endemic centres owing to infants becoming infected without showing any clinical signs of yellow fever.]

E. H.

DE MELLO (E. Jansen) Indices de mosquitos e outros indices em campanhas anti-amarillicas [Indices of Importance in Yellow Fever Campaigns.]—*Folha Med* 1929 June 15 Vol. 10 No 17 pp 197-203

This is a valuable article but one which unfortunately cannot be abstracted and must be consulted in the original. It deals with statistical methods in general and proceeds to demonstrate these methods by special application to mosquito prevalence and breeding sites and other matters of importance in yellow fever and the various factors which influence them. As a running commentary it points out also the dangers of compilation of statistics by persons who are not fully alive to the pitfalls which beset their path.

H. Harold Scott.

CAZANOVE (F) Le diagnostic prophylactique et les symptômes de début de la fièvre jaune. [Prophylactic Diagnosis and Symptoms in the First Stages of Yellow Fever]—*Bull Soc Path Exot* 1929 June 12. Vol. 22. No 6 pp 447-473

The author in this long and detailed account insists on the importance of an early diagnosis of yellow fever and discusses the best methods of recognizing the disease. A negative examination for blood protozoa (malaria, etc.) combined with the presence of albumin in the urine is considered a sufficient indication of the disease especial weight being given to the latter symptom. The paper is accompanied by details of numerous cases illustrating the points considered by the author.

In the discussion Prof MARCHOUX gave his opinion that yellow fever epidemics often start with very mild cases which are not recognized until after mosquitoes have had the opportunity of becoming infected. Continuous anti-mosquito measures seem to be the only certain method of preventing the return of epidemics.

E. H

LINS (Sinval A.) Contribuição ao estudo clinico da febre amarella. [Contribution to the Clinical Study of Yellow Fever.]—*Archivos de Hyg* Rio de Janeiro 1929 Vol. 3 No 1 pp 195-404 With 33 charts. [Refs in footnotes.]

Long though this article is, it is not lengthy it is worth reading more than once and should be reproduced in English so as to reach a wider circle. Here it is only possible to intimate the outlines of the article. The author divides cases into three main groups abortive mild renal, and hepato-renal with albuminuria, haemorrhages and jaundice. This last group he again divides into three grades, benign, severe, and hypertoxic, and seven further subdivisions according to the predominance of certain special symptoms. [From the point of view of a clinical study this is valuable but in practice it would hardly be possible to relegate many cases under one or other head.] Cases are reported in detail to illustrate the author's points. He next considers special symptoms such as temperature, pulse, results of blood examination of the van den Bergh test and of the urine and gives his interpretation of the results and of the pathogenesis of the main symptoms. The

blood examinations comprise the morphological changes, the coagulability and the chemical findings, and from these he discusses the metabolic changes in the body. A special section is given to the pathogenesis of haemorrhages. A few words are added on treatment, though the author aptly sums the matter up thus: "Yellow fever is a disease which either gets well of itself or kills in spite of all treatment. He hopes to deal with this side of the question more fully on a future occasion."

H. Harold Scott.

OTERO (Francisco) *Flebre amarilla. Exposición analítica de los síntomas en relación con el diagnóstico respectivo.* [Yellow Fever. Consideration of the Symptoms as of Diagnostic Import.]—*Semanas Méd.* 1929 June 6. Vol. 36. No. 23 (1847). pp. 1463-1471.

The author discusses the chief symptoms *seriatim* and shows that none is diagnostic alone but that the general symptom-complex is fairly stable, the most serviceable being the early and progressive albuminuria. He concludes in the following words: "A patient coming from an infected locality whether jaundiced or not, whether showing haemorrhages or not vomiting or not vomiting, but whose condition is that associated with a toxic process of rapid evolution [typhoid state] following a marked general reaction and with much albumin in the urine, should be regarded with grave suspicion."

H. Harold Scott.

CHAGAS (Evandro) & DE FREITAS (Lincoln) [In Portuguese & English] *Electrocardiogramma na febre amarela. Electrocardiogram in Yellow Fever.*—*Instituto Oswaldo Cruz, Suplemento das Memórias* 1929 May No. 7. In Portuguese pp. 72-73. In English pp. 79-85. With 33 figs. on 8 plates.

A study of variations in electrocardiograms of eleven cases of yellow fever eight of which were fatal. Although the changes are not very characteristic, the cardiac muscle degeneration is registered very accurately and may give an indication of some value for prognosis.

E. H.

FERRARI (Antonino) *A urologia na febre amarela. (Estudos realizados no Hospital São Sebastião)* [Urinalysis in Yellow Fever.]—*Brasil Medico* 1929 May 18. Vol. 43. No. 20 pp. 551-559.

Examination of the urine at different stages of yellow fever has led the author to the following conclusions regarding diagnosis and prognosis:—

1. Albumin in the first three days of fever with a negative diazo reaction, is diagnostic of the disease. The amount of albumin is of no prognostic significance.
2. The albumin increases in the second stage but clears up rapidly with convalescence. Chronic nephritis is rare as a sequela.
3. A large quantity of urates in the first or second stage is a favourable indication.

- 4 Glycosuria is not met with. The degenerative lesions of the liver, pancreas, and kidneys account for the slow elimination of glucose.
- 5 The increased acidity calls for the use of alkalies of which sodium bicarbonate is best.
- 6 Oliguria is constant from the second to the fourth days.

H. Harold Scott

LE BOUCHER (H.), CAPÉLAN (G.), LAIGRET (J.) & TCHERNENKO (A.)
 Note sur un cas d'ictère à vomissements noirs. [Note on a Case of
 Jaundice with Black Vomit.]—*Bull Soc Path Exot* 1929 July 10
 Vol. 22 No. 7 pp 612-618 [2 refs.] [Hoep & Vaccine & Biol.
 Lab. Bamako]

The record of an obscure case at Bamako in which the patient, a French soldier, died with symptoms closely resembling yellow fever including jaundice and black vomit. Examinations for blood protozoa and spirochaetes and also blood cultures gave negative results, as did inoculations into guinea-pigs and a *Cynocephalus* monkey. This was an isolated case, no others being observed amongst the other soldiers or the natives of the vicinity in spite of the presence of *Aedes aegypti*. The nature of the case was not decided.

E. H.

TORRES (C. Magarinos). Sur les inclusions nucléaires dans la fièvre jaune expérimentale (virus brésilien et africain). [The Nuclear Inclusions in Experimental Yellow Fever (Brazilian and African Strains)].—*C. R. Soc Biol* 1929 July 17 Vol. 101 No. 24 pp 951-952. [1 ref.]

Further investigation of these intranuclear bodies [*ante* p. 648] shows that they are most evident in monkeys inoculated with the Brazilian strain on the 6th to 10th days after inoculation and in those which die earlier the bodies may be absent. After recovery the inclusions gradually disappear. In one case however they were found in the liver of a monkey which died 36 days after inoculation. Thirteen monkeys inoculated with the African virus which all died in 3 to 9 days all showed the presence of these inclusions which evidently develop much more rapidly with this strain than with the Brazilian one.

E. H.

TORRES (C. Magarinos). Altérations nucléaires des cellules du foie chez les singes inoculés avec les virus brésilien et africain de la fièvre jaune. [Nuclear Alterations in the Liver Cells of Monkeys inoculated with Brazilian and African Strains of Yellow Fever].—*C. R. Soc Biol* 1929 July 17 Vol. 101 No. 24 pp 959-961. With 1 text fig. [2 refs.]

Although these intranuclear bodies were found in five monkeys infected by the inoculation of blood from patients they were not found in the livers of twelve fatal cases of the disease in human beings. The author considers that the disappearance of the virus from the blood and organs before death is an explanation of the absence of the bodies in these cases.

E. H.

HOFFMANN (W. H.) Einschlüsse in den Leberkernen beim menschlichen Gelbfieber [Intranuclear Inclusions in the Liver of Human Cases of Yellow Fever].—*Arch. f. Schiffs u. Trop. Hyg.* 1929 Aug. Vol. 33 No. 8. pp. 411-413

The author re-examined a large number of his old sections of human yellow fever livers and in only one instance were intranuclear bodies found. These were in the liver from a West African case of the disease, which from its general appearance suggested a very acute attack. The author is of the opinion that the intranuclear bodies are the result of nuclear degeneration, but it remains to be discovered whether the yellow fever virus is responsible for their appearance, or is possibly concealed by them.

[It is of interest that TORRES (see above) failed to find these bodies in human cases of the disease and HOFFMANN's results agree with the view that they are very rarely present at death by which time the virus has usually disappeared from the body.]

E. H.

FIALHO (Amadeu) Contribuição ao estudo da anatomia patológica da febre amarela. Primeira memoria. Diagnostico anatomico. [A Contribution to the Pathological Anatomy of Yellow Fever].—*Archivos de Hyg. Rio de Janeiro* 1929 Vol. 3. No. 1 pp. 37-81. With 5 coloured plates. English summary facing p. 80.

The author performed some scores of autopsies on yellow fever cases in Rio de Janeiro and gives a summary of the main features in their gross pathology which agree with those that have been described in other epidemics. The paper contains five good coloured plates illustrating respectively the surface of the heart, the lining of the stomach, the tongue and posterior buccal cavity, sections of the kidney and liver and finally a section of another kidney and the surface of a lobe of the liver.

E. H.

MONTENIRO (J. Lemos) Estudos sobre a febre amarela. Sobre a possibilidade de um diagnostico bacteriologico da febre amarela. Nota previa. [Bacteriological Diagnosis of Yellow Fever].—*Brazil-Medica*. 1929 May 11 Vol. 43 No. 19 pp. 514-521 [Botantan Inst. Sao Paulo.]

The author points out the difference between mere "association" organisms in disease and "synergism" in which two organisms react beneficially or antagonistically upon each other. As examples he cites influenza bacillus and streptococci, hog-cholera and pasteurellosis, Proteus X19 and Rickettsia in typhus.

From the faeces of *Al. levis* experimentally infected with yellow fever he isolated certain Gram-positive Corynebacteria which he designated M15 F3 F4 and F8. Of these he describes F4. It is a small bacillus 3 by 0.5 microns, pleomorphic and at times diplococcoid, fermenting dextrose and insulin slightly laevulose strongly.

The sera from infected monkeys and from human cases from the third day of fever till convalescence agglutinated this in titres up to 1 in 320 and occasionally to 640. With typhoid, influenza and other diseases the results were negative and the author regards the reaction as of diagnostic value in early and doubtful cases of yellow fever.

H. Harold Scott.

DAVIS (N. C.) & BURKE (A. W.) *Studies on South American Yellow Fever I. The Strains of Virus in Use at the Yellow Fever Laboratory in Bahia, Brazil.*—*Jl Experim. Med* 1929 June 1 Vol. 49 No 6 pp 975-984 [1 ref.] [Internat Health Division Rockefeller Foundation New York.]

Five strains of yellow fever have been studied three isolated from local cases of the disease, the other two obtained from Rio de Janeiro and Lagos respectively. The strain from Rio was not very virulent to monkeys, rarely causing death whilst the one from Lagos the Asibi strain, was highly virulent and nearly always fatal. Of the local strains the B.B. was isolated by the inoculation of blood collected from a fatal case 72½ hours after the patient was said to have been taken ill. The first monkey showed fever (104.3° F) on the 11th day and transfer was made to another animal. This showed fever on the 7th day the next two passages both on the 3rd day. Subsequently the virulence diminished but was established again in mosquitoes. It has been carried through 14 passages and, out of 135 inoculated animals, 26 died or were sacrificed when moribund. The strain, however is now much more fatal than these figures would indicate.

A second strain ('S.R.') was obtained from a very mild case of the disease, showing fever and albuminuria, but no jaundice or black vomit. Blood collected 66 hours after the onset was inoculated into a monkey which showed fever after 7 days. Its blood was then inoculated into a second animal which died of yellow fever on the 5th day. Animals that recovered from this strain were immune to the B.B. virus and also to the African virus.

A third strain ('J.V.O.') was isolated from a patient who died between 3 and 4 days after first showing signs of illness. Liver spleen and kidney tissues collected at autopsy were inoculated separately into monkeys. That inoculated with spleen died of an intercurrent infection, the animal receiving liver remained unaffected and was later shown to be susceptible as it died of yellow fever in 4 days when inoculated with the B.B. strain. The monkey that received kidney emulsion showed fever on various occasions but this was considered to be the result of a bacterial infection of the blood. On the 20th day the temperature rose to 105 F and the monkey was killed. Sections of liver showed the presence of much fat but no necrosis. Liver and blood collected from this animal were inoculated into a second monkey whose temperature rose to 105.9 F on the fourth day. On this day mosquitoes were fed on the monkey which recovered from its infection. Later it was inoculated with a virulent strain of yellow fever (B.B.) and showed not the slightest reaction. The mosquitoes produced a slight and non fatal infection in monkeys but although passages were made the strain remained quite nonvirulent.

[The presence of virus in a monkey 20 days after the original inoculation is most unusual. Moreover it is of interest that this animal had only been inoculated with kidney from a fatal case of the disease. This patient died after being ill for approximately only 80 hours and thus may explain why the virus had not yet disappeared as hitherto the inoculation of material from human autopsies has given negative results.]

DAVIS (Nelson C.) Studies on South American Yellow Fever. II. Immunity of Recovered Monkeys to African Virus.—*Jl. Experim. Med.* 1929 June 1 Vol. 49 No. 6 pp. 985-991 [3 refs.] [Internat. Health Division, Rockefeller Foundation, New York.]

Details are given of the results of inoculation of the Asibi strain of African virus into 22 monkeys recovered from Brazilian yellow fever, including four different strains. One of the monkeys succumbed to the African strain, although it had previously survived a typical attack of a Brazilian strain. The remaining monkeys were all immune. As the author remarks, although there are quantitative differences in virulence and minor differences in behaviour the African and Brazilian strains of yellow fever virus that have been tested are immunologically the same. [See this *Bulletin* ante p. 306.]

E. H.

DAVIS (Nelson C.) & SHANBOM (Raymond C.) Studies on South American Yellow Fever III. Transmission of the Virus to Brazilian Monkeys Preliminary Observations.—*Jl. Experim. Med.* 1929 July 1 Vol. 50 No. 1 pp. 81-85 [2 refs.] [Internat. Health Div. Rockefeller Foundation, New York, & Yellow Fever Lab. Bahia, Brazil.]

A record of the transmission of yellow fever from rhesus monkeys to Brazilian monkeys, *Cebus macrocephalus* both by blood inoculation and the bites of infected mosquitoes. The *Cebus* never developed any clinical or pathological signs of yellow fever yet the virus persisted in the circulation for at least two days. Mosquitoes were infected by feeding on *Cebus* monkeys, and moreover rhesus monkeys were infected by the inoculation of blood from *Cebus* that had either been injected with blood containing the virus, or bitten by infected mosquitoes.

E. H.

ARAGÃO (H. de Beaurepaire) & LIMA (A. da Costa) [In Portuguese & English.] Sobre a transmissão do vírus da febre amarela pelas fezes de mosquitos infectados. [On Transmission of the Virus of Yellow Fever by Excreta of Infected Mosquitoes.]—*Inst. Oswaldo Cruz, Suplemento das Memórias* 1929 June 22 No. 8 In Portuguese pp. 101-104 In English pp. 105-108. With 2 figs. on 1 plate also in Portuguese in *Brasil Medico* 1929 June 15 Vol. 43 No. 24 pp. 660-671 and in French in *C. R. Soc. Biol.* 1929 Oct. 18 Vol. 102 No. 26 pp. 53-54 [Oswaldo Cruz Inst. Rio de Janeiro.]

— & — [In Portuguese & English.] Sobre a infecção do *M. rhesus* pela deposição de fezes de mosquitos infectados sobre a pele ou na conjunctiva ocular íntegra. [On the Infection of *M. rhesus* by Contact of the Uninjured Skin and Conjunctiva with the Excreta of Infected Mosquitoes.]—*Inst. Oswaldo Cruz Suplemento das Memórias* 1929 July 31 No. 9 In Portuguese pp. 133-135 [2 refs.] In English pp. 136-138 [2 refs.]

ARAGÃO (H. de Beaurepaire) & LIMA (A. da Costa) [In Portuguese & English.] Sobre o tempo necessario para que *Stegomyia* infectados excretem fezes virulentas. [About the Time required by the Infected *Stegomyia* to expel Virulent Excreta.]—*Ibid* In Portuguese pp 139-141 In English pp 142-145

— [In Portuguese & English] Infecção do *Aedes aegypti* macho e possibilidade da propagação da febre amarella de *Stegomyia* a *Stegomyia* sem passagem pelo homem [On Infection of the Male "*Aedes aegypti*" and the Possibility of Propagation of Yellow Fever from *Stegomyia* to *Stegomyia* without Passage through Man.]—*Ibid* In Portuguese pp 190-192. In English pp 193-195

— Possibilidade da infecção de *Aedes aegypti* machos com virus da febre amarella. [The Possibility of Infecting Male *Aedes aegypti* with the Virus of Yellow Fever]—*Brasil Medico* 1929 June 15 Vol. 43 No 24 p. 671 also in French in *C R Soc. Biol.* 1929 Oct. 18. Vol. 102. No 26. pp. 54-56.

The authors collected the faeces of *Aedes* sp infected with yellow fever and inoculated them into *Macacus rhesus*. The results clearly show that the virus is present in the faeces of mosquitoes whose bites are infective. The virus in the faeces is able to produce infection through the ocular conjunctiva and also through the intact skin. In the latter case the authors carefully examined the surface of the skin with a binocular microscope before applying the virus in order to be certain that no injuries were present. The virus was found to be present in the faeces of mosquitoes that had fed on an infected monkey respectively 5 and 7 days previously. The last of these papers by Dr Aragão records the infection of male *Aedes aegypti* by feeding them with a mixture of infected blood and honey. Three monkeys were infected by the inoculation of the contents of male mosquitoes respectively 13, 14 and 30 days after being fed on an emulsion containing the virus. The author then placed normal male mosquitoes in a cage with infected females and after 12 days the males were found to have become infected as tested by inoculating their contents into a monkey. The first monkey had a very mild infection but a second monkey inoculated with blood from the first showed a typical attack of yellow fever [Owing to a printer's error in the English account the number of the monkey is given as 425 instead of 426].

Finally a monkey was inoculated with an emulsion of 4 female mosquitoes that had been left in contact with infected males for 17 days. This animal succumbed to a typical attack of yellow fever. These experiments show that in addition to the possibility of infecting male mosquitoes female mosquitoes can become infected by being placed in contact with infected males and vice versa male mosquitoes can acquire infection from contact with infected females. [These interesting experiments show that the virus can be spread among mosquitoes without the necessity of feeding on infected blood. It should be mentioned, however that the positive results of the last experiments could be explained on the supposition that the insects had become soiled with the infective faeces of the opposite sex. It is difficult to conceive any manner in which the virus could pass through the chitinous covering of the male copulatory organs.]

ARAGÃO (Henrique do Beaurepaire) Possibilidade da propagação directa de febre amarella de stegomyia a "*Aedes aegypti*" sem intervenção do homem. [The Possibility of Yellow Fever being transmitted directly by *Aedes aegypti* without Human Intervention.]—*Brasil Medico* 1929 Aug. 3. Vol. 43. No. 31 p. 835 [Oswaldo Cruz Inst., Rio de Janeiro.]

The author has recorded previously (see above) the infection of male *Aedes* by allowing them to feed on defibrinated blood of an infected Rhesus the mosquito being coaxed to feed by addition of 5 per cent. honey to the blood. He confirms these findings by two further similar tests, monkeys being infected with yellow fever by injection of an emulsion of male *Aedes* which had so fed thirteen or more days before.

It is concluded, therefore that (1) Male *Aedes aegypti* can be infected with the defibrinated blood of an infected rhesus (2) Male *Aedes* can become infected by being kept in contact with infected females and vice versa (3) Infection of mosquito by mosquito is possible and, even though it may not be frequent, this fact may serve to explain the occurrence of yellow fever at long intervals without detection of intermediate cases.

H. Harold Scott.

CHAGAS (Carlos) La fièvre jaune. Recherches expérimentales effectuées à l'Institut Oswaldo Cruz. [Yellow Fever. Experiments performed at the Oswaldo Cruz Institute.]—*Bull. Soc. Path. Exot* 1929 June 12. Vol. 22. No. 6. pp. 398-407

A summary of recent work on yellow fever at the Oswaldo Cruz Institute. The only new information is contained in a brief reference to the first results of using yellow fever vaccine. During this year's epidemic in Rio more than 15,000 persons were vaccinated, the subjects being mainly immigrants or persons particularly exposed to the chance of infection, and 14 became infected. The author considers that the dosage was probably insufficient to overcome the extreme susceptibility of certain individuals. [Aragão's modification of Hinde's vaccine was used in these experiments. See this *Bulletin* ante p. 303-4]

E. H

VELLARD (J) & VIANNA (M) Modifications de la coagulation sanguine dans la fièvre jaune. Leur importance pour le diagnostic précoce. [Modifications in the Coagulation of the Blood in Yellow Fever, their Importance for Early Diagnosis.]—*C. R. Acad. Sci.* 1929. May 27 Vol. 188. No. 22. pp. 1452-1455. [1 ref.]

— & — Modifications de la coagulation sanguine dans la fièvre jaune.—*Inst. Oswaldo Cruz, Supplémento das Memórias.* 1929. May No 7 pp. 86-99 With 3 plates. [Vital Brazil Inst., Niteroy.]

— & — Modifications de la coagulation du sang dans la fièvre jaune.—*C. R. Soc. Biol.* 1929 July 17 Vol. 101 No. 4 pp. 961-962 [1 ref.]

— Modifications da coagulação sanguínea na febre amarela.—*Brasil-Médico.* 1929 May 25 Vol. 43. No. 21 pp. 588-596. With 2 charts.

The diminution in the coagulability of the blood of yellow fever cases has often been recorded, without its origin having been determined. The authors, therefore made a careful study of the blood in 23 cases

of yellow fever 12 convalescents and 7 doubtful cases. The results indicate that the coagulating properties of the serum are very irregular resembling those of normal individuals. The coagulability of the plasma, from the second day of the disease is invariably very much diminished, reaching its greatest diminution on the 7th to the 9th days after which it gradually rises again. The changes are mainly due to the appearance of large quantities of antithrombin in the blood there being little change in the amount of fibrinogen. The diminution in the coagulability exceeds that in any other disease studied by the authors, and may be of use in the early diagnosis of yellow fever. From the point of view of prognosis, a rapid and extreme diminution is a very grave sign, as it indicates profound changes in the liver.

Macacus rhesus infected with yellow fever showed similar changes in the blood, but these seemed to develop more slowly and were less evident than in human cases.

E. H.

VELLARD (J.) & VIANNA (Miguelotte) Modifications de la coagulation sanguine au cours de la fièvre jaune expérimentale chez le *Macacus rhesus* [Modifications in the Blood Coagulation during the Course of Experimental Yellow Fever in *Macacus rhesus*].—*C R Acad Sci* 1929 Sept. 16 Vol. 189 No 12. pp 430-432.

The authors have studied this property in 16 monkeys infected with the Brazilian virus and obtained results resembling but to a lesser degree, those obtained in human beings [see above]. The anti coagulating power is never complete, which is in accordance with the circumscribed haemorrhages observed in monkeys. The animals which recovered from the disease showed no diminution in the coagulability of the blood.

E. H.

CRUZ (J da Costa) Teneur du sérum en alexine dans la fièvre jaune. [The Amount of Complement in Yellow Fever Serum].—*C R Soc Biol* 1929 July 17 Vol. 101 No 24 pp 948-949
— Diagnostic de la fièvre jaune par le dosage de l'alexine.—*Ibid* pp 954-956 [1 ref.] [Oswaldo Cruz Inst Rio de Janeiro]

The author has tested the amount of complement present in the sera of eight yellow fever patients and six convalescents. The results indicate a marked diminution to less than a quarter in the blood of yellow fever patients, due to a real absence of complement and not to the development of anticomplement in the sera. During convalescence the amount of complement was found to become rapidly re-established, and in two cases was normal only four days after the fever had disappeared. In two other cases 15 days after recovery the amount was in excess of normal. The author remarks that in acute infectious diseases it is very rare to observe any diminution in the amount of complement, and consequently this test may be of help in the diagnosis of doubtful cases.

In the second article further evidence is adduced in support of the value of this test. 103 patients were examined of whom 51 showed lack of complement. Of these 51 46 were diagnosed clinically as yellow fever and in only one instance was the complement reaction negative and the clinical diagnosis positive for this disease.

E. H.

FROBISHER, Jr (Martin) The Complement Fixation Test in Yellow Fever.—*Proc. Soc. Experim Biol & Med* 1929 June. Vol. 28 No. 9 pp. 846-848. [4 refs.] [Internat. Health Division, Rockefeller Foundation, New York.]

After trying several antigens the author found that the most satisfactory results were obtained with a saline extract of liver and spleen. Hindle's method [*ante* p. 292] was employed for extracting the virus from the tissues, whereby the cells are exposed to sudden changes in osmotic pressure and the resulting suspension was centrifuged and passed through Berkefeld V filters. The filtrate constituted the antigen. As control, an antigen was similarly prepared from the tissues of a normal monkey. The results of complement fixation tests are given in the following table —

RESULT OF COMPLEMENT FIXATION TESTS IN YELLOW FEVER.

Sources of sera tested.	Antigen Used.					
	Saline extract of liver and spleen of yellow fever monkeys.			Saline extract of liver and spleen of normal monkeys.		
	Positive	Negative	% Correct	Positive	Negative	% Correct
Normal men and monkeys	3	38	83	1	23	97
Recovered and immune men and monkeys	18	5	78	3	9	73
Convalescents from other diseases	1†	19	95	0	18	100

Syphills 14 dengue 4 poliomyelitis 2 (1 human, 1 monkey)
† Syphills.

The results clearly indicate that this method offers a means of identifying a large percentage of yellow fever convalescents. Sera collected on the first day of fever did not give strong or frequent reactions and the presence of syphills antigens interfered with the fixation of complement in yellow fever convalescents. Although the antigen was prepared from a monkey infected with a West African strain of the disease positive reactions were obtained with the sera of both monkeys and human beings infected with the Brazilian strain.

E. H.

MOSES (Arthur) Reações sorológicas na febre amarela. [Serum Reactions in Yellow Fever.]—*Archivos de Hyg* Rio de Janeiro. 1929 Vol. 3. No. 1 pp. 27-35. [10 refs.] French summary facing p. 35.

By using "cocto-antigens" containing yellow fever virus, and using exact methods of estimating the results of haemolysis and precipitation, both anti-bodies and precipitins were shown to be present in the serum of yellow fever patients. The antibodies were present from the 3rd to the 24th day of the disease, but especially on the 5th and 6th

days, after which they gradually disappeared. They were not found in the sera of patients suffering from other diseases and the reactions were only obtained with the specific antigens. In the serum of rabbits hyperimmunized by intravenous inoculations of the yellow fever material used as antigen the same antibodies were found.

E. H.

HUDSON (N. Paul) PHILIP (Cornelius B.) & DAVIS (Gordon E.)
Protection Tests with Serum of Persons recovered from Yellow
Fever in the Western Hemisphere and West Africa.—*Amer Jl
Trop Med* 1929 July Vol. 9 No. 4 pp 223-232. [3
refs.]

The sera from five out of six persons convalescent from yellow fever in Brazil, in doses of 1 cc. and 2 cc. protected monkeys against the West African virus. The serum of one convalescent failed to protect against the inoculation of virus, but subsequently a monkey inoculated with 1 cc. of the same serum was bitten by 5 infected mosquitoes without showing any signs of infection.

The sera of four natives who had yellow fever in West Africa were also tested, by the simultaneous inoculation of serum and virus into monkeys. Three of the sera were protective and the one that failed protected 6 monkeys in other tests before and after the one in question. These results furnish additional evidence of the identity of yellow fever in America and West Africa. [See above.]

E. H.

PHILIP (Cornelius B.) Preliminary Report of Further Tests with
Yellow Fever Transmission by Mosquitoes other than *Aedes
aegypti*—*Amer Jl Trop Med* 1929 July Vol. 9 No. 4
pp 267-269 [3 refs.] [Internat. Health Division of Rockefeller
Foundation, Lagos.]

Three more species have been shown to be capable of transmitting yellow fever to monkeys by their bites in addition to those recorded by BAUER [this *Bulletin* Vol. 25 p 848]. These are *Aedes vittatus* (Bigot) (= *sugens* Theo) a common semi-domestic species *Aedes africanus* (Theo) a bush species which is partial to bamboo stumps *Aedes simpsoni* (Theo) an infrequent tree-hole breeder in Lagos, but more common inland. This latter species is a particularly willing biter in the laboratory and will feed on human beings as readily as *A. aegypti*.

[This brings the list of mosquitoes shown to be capable of transmitting the disease experimentally up to a total of seven, and indicates that the epidemiology of yellow fever is not such a simple matter as was previously supposed.]

E. H.

MARCHOUX (E.) La fièvre jaune et la sensibilité du *Macacus rhesus*
[Yellow Fever and the Susceptibility of *Macacus rhesus*]—*Ann
Inst Pasteur* 1929 June, Vol. 43 No. 6, pp 737-748.
[18 refs.]

The author again calls attention to the fact that the experiences of the French Yellow Fever Commission in Brazil (1903) were against the view that the virus of this disease is able to pass through the skin. In support of this view it is mentioned that the members of the Commission

performed about one hundred antopies with bare hands, yet none of them became infected. [Recent experiments, however have shown that in human cases the virus practically always disappears from the blood and organs before death] Also their hands were often soiled with blood when collecting blood from the veins of patients.

In order to find out if the virus could pass through the unbroken epidermis a few experiments were made. Blood was collected from a monkey two days after inoculation. After defibrinating, some of the blood was inoculated subcutaneously into a monkey which showed no signs of infection, but was immunized against a subsequent inoculation of infected liver. A second monkey had some of the blood placed on excoriated skin, and allowed to dry. It remained uninfected but when the procedure was repeated with an emulsion of infected liver it became infected and died of yellow fever. A third monkey had the same quantity of blood placed on the intact skin and later infected liver material, but remained healthy. A fourth monkey received a drop of the defibrinated blood in the conjunctival sac of the right eye and remained uninfected. When subsequently infected liver emulsion was similarly introduced, the animal died of yellow fever five days later. A control animal inoculated intraperitoneally with the liver emulsion died of the disease three days later. Infected liver preserved in the ice chest was found to have lost its virulence and also its power of conferring immunity within five months. The author discusses prophylactic measures and points out the necessity of maintaining anti-mosquito measures in all endemic regions. Usually these are relaxed after a few years and conditions are then liable to favour the development of fresh outbreaks of the disease. Finally it is stated that in both Africa and America where the mean isotherm is above 20 C a country is not safe from yellow fever unless the number of mosquitoes is less than 10 units for each area, and the number of *Aedes* less than 2 per cent of the total.

E. H.

DINGER (J. E.) SCHÜFFNER (W. A. P.) SNIJDERS (E. P.) & SWELLE GREBEL (A. H.). Onderzoek over gele koorts in Nederland. (Eerste mededeeling). [Yellow Fever Research in Holland. (First Communication).]—*Nederl. Tijdschr. v. Geneesk.* 1929 July 13. Year 73. 2nd Half. No. 28. pp 3255-3257

Since *Macacus rhesus* has been found to be susceptible to yellow fever new paths for research are opened, and the authors took up the question of the possibility of transmission of yellow fever under natural circumstances in the Dutch East Indies. In view of the danger of such experiments in the tropics, they were carried out at Amsterdam with monkeys (*Macacus cynomolgus*) and mosquitoes (*Aedes aegypti*) from Java. The virus was obtained from Prof. PERRIN (Paris) in the shape of frozen blood and liver of an infected monkey. It proved to be highly virulent. Of 6 infected cynomolgus monkeys one died. It did not show the typical post-mortem picture, but the virus was shown to be present in its organs by successful inoculation into two rhesus monkeys. Possibly the 5 other cynomolgi had a light type of the disease. Anyhow the cynomolgi are to be considered as a possible reservoir of the virus.

The bite of *Aedes aegypti* 19 days after its sucking the blood of an infected monkey was fatal to a healthy rhesus. Accordingly the

mosquito is susceptible to the yellow fever virus. A natural immunity of the D.E.I. does not exist. In view of the possibility of import of the disease from America, this conclusion is of great practical importance.

The experiments are to be continued.

W J Bals.

SAWYER (W A.) LLOYD (W D M.) & KITCHEN (S F) *The Preservation of Yellow Fever Virus.*—*Jl Experim. Med* 1929 July 1 Vol. 50 No 1 pp 1-13 [8 refs] [Internat Health Div Rockefeller Foundation & Rockefeller Inst for Med Research New York.]

A detailed account of experiments on various methods of preserving yellow fever virus. As noted by previous observers the virus may be preserved if dried in vacuo. The best method was found to be freezing and drying blood collected from a monkey on the first day of an attack of the disease and storing the dry material in sealed glass tubes containing calcium chloride. The dried virus when kept in a refrigerator has been preserved for at least 154 days. The virus may be preserved for at least 30 days in liver kept frozen but clotted or citrated blood soon loses its virulence. Infected blood or liver in 50 per cent glycerine stored in the refrigerator usually contains virus for at least 60 days and possibly 100 days but the older material gradually loses its virulence.

[No reference is made to the reviewer's experiments with dried virus. This method of preservation was first recorded in July 1928 (this *Bulletin* Vol. 25 p 850) and details of experiments on this and other methods of preservation were published in January 1929 *ibid* p 292.]

E H

PETIT (Auguste) STEFANOPOULOU (Georges) & KOLOCHINE (Constantin) *Conservation du virus amaril. [The Preservation of Yellow Fever Virus.]*—*Bull Acad Méd* 1929 July 30 Year 93 3rd Ser Vol. 102. No 29 pp 98-104 [7 refs]

A useful summary of recent observations on this subject in which the author includes his own experiences. The best method of preserving infected liver or blood in the refrigerator was to mix it with a glycerine phosphate mixture recommended by VALLÉ. This consists of equal parts of 0.235 per cent. dipotassium phosphate and 0.090 per cent. monopotassium phosphate. These are mixed and glycerine added equal to the quantity of the phosphate mixture. Intraperitoneal and intrahepatic inoculations were found to be more certain than the subcutaneous method. The author has seen monkeys die of yellow fever without showing any febrile symptom. Jaundice was never clearly developed with the Senegal strain, but a monkey infected with the Asibi strain showed very evident jaundice. The duration of the disease in the case of monkeys infected with the Senegal strain has varied between 3 and 8 days and the average duration for 14 months is given in tabular form. The results start with an average of 4.6 and finish with 5.2, so there has been no appreciable variation during this period. The Asibi strain has given comparable results the first monkey dying in 5 days. Two *Macacus rhesus* and one *M cynomolgus* which were resistant to the Senegal virus were also resistant to the Asibi strain.

E. H.

HOFFMANN (W. H.) Europa und das Gelbfieber [Europe and Yellow Fever]—*Munch Med Woch* 1929 Sept. 27 Vol. 76 No. 39 pp 1623-1627 [Finlay Inst. Havana, Cuba.]

A general discussion of the present position of the epidemiology of yellow fever calling attention to the fact that West Africa is a potential source of danger to Europe

E. H.

BARRETO (João de Barros) Notas epidemiológicas sobre a febre amarela no Rio de Janeiro em 1928. [Epidemiological Data on the Yellow Fever Outbreak in Rio (1928)]—*Archivos de Hyg* Rio de Janeiro 1929 Vol. 3 No. 1 pp 93-193 With 15 figs. on 6 plates & 1 folding map English summary

A detailed account of this outbreak with epidemiological observations on 175 individual cases of yellow fever

E. H.

PETIT (Auguste) A propos de la fièvre jaune [Concerning Yellow Fever]—*Rev Méd Chirurg des Maladies du Foie* Paris, 1929 Mar-Apr Vol. 4 No. 2 pp 133-139 [1 ref.]

A summary of recent work on the subject. Nothing new

E. H.

ARAÚJO (Henrique de Beaurepaire) Febre amarela experimental do Brasil. [Experimental Yellow Fever in Brazil]—*Brasil-Médico* 1929 July 27 Vol. 43 No. 30 pp 849-853

This paper read before the South American Hygiene Conference, gives an account of the work of the author and others on yellow fever—the search for the virus, the hypothetically aetiological germs, *Cryptococcus xanthogenus*, *Leptospira icteroides*, *B. hepatodystrophica*, etc., the serological diagnosis and the preparation and use of the vaccine—but contains nothing which has not already received notice in the *Bulletin*.

H. Harold Scott.

BARBOSA (J. Flacido) Pequena história da febre amarela no Brasil—*Archivos de Hyg* Rio de Janeiro 1929 Vol. 3 No. 1 pp. 5-25 [9 refs.] English summary

BARROSO (Sebastião) O problema da febre amarela no Brasil—a luz dos factos—*Brasil Médico* 1929 Apr 27 Vol. 43 No. 17 pp 433-437

LEITE (Václav) & P. ARAÚJO (Decio) Aspectos epidemiológicos prophylacticos da campanha de febre amarela no Estado do Rio de Janeiro em 1928—*Folha Méd* 1929 Aug 13 Vol. 10 No. 23 pp 250-257

OTERO (Francisco) Febre amarilla. Un caso de forma adinamica, atendido en el hospital dotante. Doctor Rodolfo del Vial—*Semanas Méd* 1929 May 16 Vol. 36 No. 20 (1844) pp 1264-1267

OTERO (Francisco) Febre amarilla. Su diagnóstico diferencial.—*Semanas Méd* 1929 June 27 Vol. 36 No. 26 (1850) pp. 1682-1683. [2 refs.]

OTERO (Francisco). Febre amarilla. Su anatomia patológica.—*Semanas Méd* 1929 July 23 Vol. 36 No. 30 (1854) pp 261-265 [1 ref.]

PIA A (Oswino) & DE FIGUEIREDO (Buric) Contribuição o estudo da histopathologia do fígado na febre amarela—*Folha Méd* 1929 Janr 15 Vol. 10 No. 20 pp 229-233. With 6 text figs.

RESENDY AZ (P) Resum dos resultados das pesquisas sobre a febre amarela—Reprinted from *Rev. da Méd* 1929 \ 7 pp. 467-473 [48 refs.]

BLACKWATER FEVER.

RUGE (Reinhold) Ein Beitrag zur Schwarzwasserfieber Frage [The Blackwater Fever Question].—*Arch f Schiffs u Trop Hyg* 1929 June Vol. 33 No 6 pp 328-330 [6 refs]

Of the many hypotheses regarding the etiology of blackwater fever that of NOCHT seems to have most to support it. NOCHT believes that in all three species of malaria parasites particular strains occur which exhibit a special haemolytic action just as is the case with certain strains of bacteria. The author considers that the following facts support this view —

1 Most cases of blackwater fever occur in tropical infections quotations from various authors are given in support of this statement

2. H RUGE (1928) found that amongst the cases of malaria coming from West Africa and treated at Hamburg about 96 per cent were *Tropica* 4.2 per cent developed blackwater fever and of these only 0.43 per cent. came from other parts of the world. The West African *Tropica* alone had a blackwater morbidity of 4.4 per cent and the *Tropica* of other parts of the World nil. Even in the unusually severe intractable Brazilian malaria (*Tropica* + *Tertian*) in which the number of relapses was 25 times as high as in other forms the black water fever morbidity was only 1.2 per cent

3 This suggests that the West African malaria has a particular haemolytic action and the question arises whether the West African *Tropica* parasite exhibits any differences—morphological or biological—from that found in other parts of the world.

4 The dispute concerning the unity of the *Tropica* parasites is not yet settled some authors distinguish three species amongst them and others two. Ruge agrees with ZIEMANN. He believes that he can distinguish between the parasite from West Africa and that from other parts of the world. The schizont of the West African form is, as a rule smaller than that of the other forms and secondly very rarely grows to larger rings in the peripheral blood so that only small and very small rings are to be seen. He also agrees with ZIEMANN with regard to specificity of the crescents and the rareness with which they are met with in preparations of blood from West Africa.

Ruge considers it is this particular West African parasite which is more rarely found in other parts of the world that is specially concerned with the haemolysis in blackwater fever

W Yorke

COLLIGNON (Bl.) Les hémoglobinuries [The Haemoglobinurias].—*Arch Méd et Pharm Msit* 1929 May Vol. 90 No 5 pp 615-641 [13 refs]

The article commences with a description of various methods of diagnosing haemoglobinuria and a list of the conditions with which it could be confused. The author classifies the haemoglobinurias as follows —

1 *Experimental haemoglobinurias* These can be easily produced by an intravenous injection of a sufficient quantity of haemoglobin (1302)

Haemoglobin exists both in the blood and in the striated muscle, and the venous injection of either results in haemoglobinuria.

2. *Clinical haemoglobinurias.* He classifies these as follows —

A Haemoglobinurias without icterus.

(a) *Toxic haemoglobinurias.*—These are most closely related to the experimental haemoglobinurias they may be the result of drug intoxication, alimentary intoxication, the introduction into the organism through the body or injection of organic haemolytic substances such as venom or haemolytic sera, and, finally the resorption of certain organic liquids, such as that resulting from the contortion of the pedicle of an ovarian cyst.

(b) *Infectious haemoglobinurias*—These may be met with in the course of septicæmia, after typhoid, pneumonia, scarlatina, diphtheria, tetanus, etc. Into this group fall the haemoglobinurias due to protozoa.

(c) *Paroxysmal haemoglobinuria*—A summary of the clinical signs and of the complications of this condition is given and the predisposing causes are discussed.

B Haemoglobinurias with icterus.

(a) *Bilious haemoglobinuric fever*—A brief description of blackwater is given which contains nothing new

(b) *Other haemoglobinurias*—Under this heading reference is made to a disease described by VIDAL due to the *Bacillus perfringens* which, when inoculated into animals, gives rise to a very marked haemolysis.

There is also a group of cases of combined icterus and haemoglobinuria of unknown cause, as, for example, the case published by CHATTAIRD and VINCENT. Such cases seem to be allied to the toxic haemoglobinurias. Finally there are the cases of simple acholuric jaundice with intermittent haemoglobinuria.

When one is confronted with a case of haemoglobinuria, one must remember that there are five possible origins of the haemoglobinuria.

1. *Urinary origin*—This is very rare. VAN ROOSEX believes that lysis of the red cells in the bladder may take place in the presence of oxalates in excess but it is doubtful whether this view is correct. There probably exist, however, some cases of haematuria in which the red cells undergo haemolysis in the urine thus giving rise to a false haemoglobinuria.

2. *Renal origin.*—This origin is considered by certain authors to explain a considerable number of haemoglobinurias. It is believed that the site of the haemolysis is the renal parenchyma. It is seen in patients who are suffering from nephritis with intrarenal haemorrhages or in patients in whom exposure to cold provokes a peripheral constriction resulting in an intense renal congestion with small haemorrhages. In these cases haemolysis takes place of the red cells which have escaped from the vessels, and the haemoglobin escapes in the urine.

3. *Muscular origin*—This is evidently very rare in human pathology. In such cases the myo-haemoglobin is eliminated by the kidneys. This theory has its origin in facts obtained from veterinary medicine. In the horse, for example, paroxysmal haemoglobinuria of muscular origin is a well-known disease.

4. *Blood origin.*—Such cases may be due to alterations in the serum or alterations in the red cells. To the former belong paroxysmal

haemoglobinuria or *haemoglobinuria a frigore*. In some cases it is possible to correlate haemoglobinuria with alterations in the red blood cells. Examples are quoted where the fragility of the red cells to hypertonic solutions and normal sera is altered.

5 *A complex splenic hepatic blood and renal origin*—The author briefly discusses the various theories relating to this subject.

W Y

1. STEPHENS (J W W) *The Distribution of Blackwater Fever in India*.—*Ann Trop Med & Parasit* 1928. Aug 28. Vol. 22. No 2. pp 169-178 With 2 maps. [36 refs.]
- *The Distribution of Blackwater Fever in Burma and the Far East*.—*Ibid* pp 179-199 With 4 maps. [76 refs.]
- n. — *The Distribution of Blackwater Fever in Africa*.—*Ibid* 1929 Apr 26. Vol. 23. No 1 pp 67-102. With 2 maps. [133 refs.]

i. These two articles consist entirely of tables showing the distribution of blackwater fever in India and in Burma and the Far East respectively

ii. The distribution of blackwater in Africa is given in tabular form. It is impossible to summarize the work and it should be consulted in the original by those interested.

W Y

WHITMORE (Eugene R.) *Malarial Hemoglobinuria*.—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 101-113 With 2 text figs. [4 refs.]

— *Blackwater Fever*.—*Ann Internal Med* 1928. Oct. Vol. 2. No 4 pp 316-324 With 7 charts on folding sheet. [Georgetown Univ Washington D C]

The author has again turned his attention to malarial haemoglobinuria and through the courtesy of Dr DEEKS and others was enabled to study the disease in the Banes and Preston divisions (Cuba) of the United Fruit Company and to visit Jamaica and Panama for the purpose of collecting data. The work followed two lines (a) Epidemiological Studies and (b) Laboratory Investigations. Only the epidemiological studies are referred to in the present paper

The author first deals with the question of susceptibility with a view to obtaining an explanation of the occurrence of haemoglobinuria in some cases of malaria, but not in all. As regards racial susceptibility there is general agreement that some races are more susceptible to blackwater than others, and this is usually explained as the result of the development of a relative immunity to malaria after prolonged residence—probably generations—in the malarious region. In a table, the malaria and blackwater rates for American European, and Negro employees in the Canal Zone from 1905 to 1910 are given. Both rates are much higher in the European than in the Negro employees the low rates for the American employees were in a great part due to better living conditions and also to the high labour turnover

amongst them. From a consideration of the annual reports of the Canal Commission, it seems clear that the Negro labour is extensively exposed to malarial infection, and that the living conditions and nutrition of this class were not good yet malaria and blackwater fever rates were much lower in it than in the European class. There is no evidence of difference of susceptibility among the Europeans. In Jamaica, blackwater fever was rare no reports were obtained in the case of negroes.

The conditions in Cuba enabled the author to study blackwater in a white race which has lived for generations in the region. The Cuban race is mainly Spanish. The blood of the original Indian races probably played a relatively small part in the formation of the Cuban race, and the blood of the African slaves has become amalgamated with that of the lower and middle classes of the Cuban race. Blackwater fever is rare among the Haitians who were imported for the cane cutting season, but during four months of the year it is fairly common among the Cubans in the same area. The disease is very rare among the Jamaican negroes living in Cuba.

The author next turns to the question of family susceptibility. Some interesting information was obtained, and the data concerning a few representative families, several members of which had suffered from blackwater fever are given. This is followed by information concerning two families no member of which had suffered from blackwater notwithstanding the fact that they had presumably all suffered from malaria.

Dealing with the subject of individual susceptibility the author observes that it has long been recognized that the person who has had one attack of blackwater is quite liable to have another attack. Among persons coming from a non-malarious region, the disease occurs most frequently within 12 to 18 months after beginning residence in the malarious district. The statement that long residence of an individual reduces the liability to blackwater is usually explained as due to an acquired immunity to malaria, and so to blackwater but the conditions in Cuba, with a population born and spending its life in the malarious region, do not substantiate this idea. Blackwater is common in Cuban children, and is very likely to develop before the person is twenty years of age this is undoubtedly associated with the early opportunity for the development of chronic malaria. Some of the children, however lived in a malarious region until they were 16 or 18 before developing blackwater. There was here as elsewhere a tendency for a person who had had one attack of blackwater to develop another. The author asks whether it is possible that we are dealing with an individual susceptibility and that the susceptible persons develop blackwater after a shorter period of chronic malaria than the less susceptible person, whilst the non-susceptible do not develop it at all.

The next section relates to quinine and blackwater fever. No one can doubt the possibility that quinine precipitates a case of blackwater. Everyone who has worked with the condition has seen cases in which he is satisfied that quinine precipitated the attack, though usually it is impossible to say whether or not the attack might have occurred in the absence of quinine. Cold will also precipitate an attack, and possibly also fatigue. All who have worked with malaria are assured that malaria is the primary factor and that except in persons who are especially susceptible to quinine, this drug is simply the last straw in the

load. Many cases have been seen in which malaria was the only factor in persons never having taken quinine. Such a case came under the notice of the author in Cuba.

The author closes his article with the following sentence —

Everything supports the belief that the efficient and intelligent administration of quinine in the treatment of malaria, as well as its utilization when required in malaria prophylaxis along with other methods of malaria prophylaxis, does not increase the incidence of blackwater fever but that in fact it markedly decreases the incidence of blackwater fever

W Y

MENK (Walter) Notes on Blackwater Fever in Banes Hospital, Banes, Cuba.—*Sixteenth Ann Rep Med Dept United Fruit Company Boston Mass* 1927 pp 113-117 [2 refs.]

Blackwater fever in the Banes Division shows epidemiologically the same features as have been described in the Panama Canal Zone. The disease exhibits a marked tendency towards the same seasonal incidence as malaria, the apex in the incidence of blackwater being slightly behind that of malaria. *P. falciparum* was found in blood films of about 50 per cent. of the patients the other two malaria parasites were not found. Parasites were more commonly found in those suffering from the initial attack of blackwater than in the second or third attack. No piroplasma, spirochaete or other type of organism was found. The disease was seldom observed in a large negro population, although they were more exposed to malarial infection than the rest of the population and their parasitic rate was very high. Blackwater fever as a rule occurs in the Cubans of predominantly white extraction in Spaniards who have lived in unscreened quarters and in individuals who neglect treatment for malaria.

A number of clinical observations are discussed. These relate to (1) Race incidence, (2) Number of attacks in the cases (3) Age incidence (4) Intervals between paroxysms of haemoglobinuria, (5) Duration of paroxysms of haemoglobinuria, (6) Mortality rates (7) Duration of stay in hospital, and (8) Treatment.

Menk states that there is a rapid reduction in the total number of the red cells during the haemoglobinuric paroxysms, and in severe cases the count may fall to 1 000 000 in a few days. He adds that the red-cell count gives a more accurate idea of the progress of the anaemia than the haemoglobin estimation (Tallquist) which may offer false values when made during the period while the blood serum is deeply coloured.

[This seems to the reviewer to be rather a loose statement. It implies that the blood serum in this disease contains a very considerable amount of haemoglobin. The statement that the blood serum is deeply coloured appears from time to time in the literature of blackwater fever but such quantitative estimations of the degree of haemoglobinaemia as have been made have not revealed a higher concentration than that contained in about a 1 per cent. solution of normal red cells.]

Marked basophilia, polychromatophilia, anisocytosis and poikilocytosis may be seen. A marked difference was observed in the staining properties exhibited by many of the red cells. Achromia and ghost cells are sometimes seen as were also *Corps en demi-lune* and Cabot's

ringa. The nucleated red cells were not found earlier than the 4th or 5th days of the disease. In the first stage of the disease the leucocyte count was usually normal but later there was a tendency to leucocytosis whilst in the convalescent period leucocytes may fall as low as 4 000 or 5 000. Even at the onset of the attack, a high percentage of immature neutrophils appear and in severe and fatal cases they may reach an astonishing number.

The appearance of the blood serum taken at the height of the attack is so characteristic, the author states, that he could not imagine anything being the cause of it other than haemoglobinaemia. The test for haemoglobin was very strongly positive in several of these cases, a positive reaction in 1 in 1,000 dilution of one dark red and one dark brown specimen of blood serum being obtained. The author estimates that haemoglobin content of the serum in blackwater is about 25 to 30 times higher than in that of the controls. The sedimentation time of the red cells was determined by the Linsemeyer technique and was found to be decidedly decreased. The complement content of the blood serum was examined in three cases, but no definite conclusion could be drawn, except that the duration of the intervals at the end of the haemoglobinuria period are not primarily determined by the disappearance of complement.

W Y

CORMACK (R. P.) Report on Blackwater Fever in Uganda for 1927—*Uganda Protectorate Ann Med & San. Rep for Year ended 31st December 1927 Appendix No III pp 75-78. With 1 chart.*

During the year 1927 106 cases of blackwater fever with 28 deaths (28.4 per cent) occurred in Uganda. In a table the number of cases and deaths reported during each of the last 20 years is given. From this table it appears that during this period 1,245 cases of the disease had been recorded. The number of deaths totalled 296 (23.8 per cent.). Analysis of the figures obtained during the last six years shows that there are three periods of greatest intensity of the disease. The most important peak is in July and the others are in March, and October or November. In another table, the incidence of the disease during the present year amongst officials, non-officials, race and sex is shown. In Buganda the morbidity rate was greater among Asiatics than among Europeans whilst in the Eastern Province the reverse was the case. Regarding the periods of residence in the tropics before the attack, the following information was obtained. One case had been less than one year in residence, 4 cases less than 2 years, 7 cases less than 5 years, 10 cases less than 10 years, 14 less than 20 years, and 16 less than 25 years all these were Europeans. Only one of the European cases is reported to have suffered from the disease previously. It was that of a woman with about 23 years residence in the tropics, who had had two previous attacks in 1914. In 103 of 106 cases there were previous attacks of malaria. A low standard of living and housing, and the liability to frequent bites from mosquitoes, combined with repeated and recent attacks of malaria inadequately treated, appeared to be potent predisposing causes. Chill, fatigue, quinine and recent malaria are stated to be the exciting causes. The authors omitted to classify the cases according to whether or not the patients

were in the habit of taking quinine prophylactically. It is stated that 11 took quinine regularly 27 took it irregularly 14 did not take it and in 3 no information was available. Information is given regarding the state of the blood before and during the attack in a number of cases

W Y

WEST AFRICAN MEDICAL JOURNAL. 1929 Jan. Vol. 2. No 3
pp 164-171—**Monthly Meeting of the Medical Practitioners of Lagos. Discussion on Blackwater Fever** [THOMSON (J W)
GRAY (G M) CONNALL (Andrew) WAKEMAN (A M.)]

Dr Thomson, who opened the discussion gave details regarding several cases of blackwater and emphasized the importance in treatment of administering large quantities of fluid. He then passed on to a consideration of factors which might be concerned in the production of blackwater. Dr Connall quoted a number of figures taken from reports sent in by medical officers during the past 13 years. Between 1915 and 1927 he received reports of 291 cases of which 157 came from Northern Provinces and 134 from the Southern Provinces. It should be noted that there are many more Europeans in the Southern Provinces than there are in the Northern Provinces. The months in which the cases occur are shown in a table. Information is also given regarding the length of residence in malaria infected countries and of the quinine habits of the patients.

Drs. Gray and Wakeman gave a detailed account of a case which recovered after nearly five days of complete anuria.

The patient felt seedy for a week before entering hospital, and three days before admission he had severe chills and had taken 20 grains of quinine and 10 grs. on each of the two following days. At 3 a.m. on September 29th 1928 the date of admission to hospital, he had a very severe chill, uncontrollable vomiting, quickly became prostrate and finally collapsed unconscious. There was no history of any haemoglobinuria before admission. On arrival in hospital at 6 a.m. the patient had regained consciousness and complained of nausea, thirst, and severe abdominal pain. The first urine passed about 10 a.m. was black and measured less than 2 ozs. During the next 24 hours he voided less than 1 oz. of similar urine and then developed complete anuria which lasted for five days. On October 5th he voided approximately 5 ozs. of dark red urine containing a heavy tarry black sediment. A few hours later he passed 1 oz. of pale yellow urine containing much less sediment. On the 6th and 7th, he passed a little more than an ounce of urine a day after this the volume slowly increased until by October 12th he was passing over 8 pints of pale clear urine. During the first week in hospital, the patient suffered greatly from nausea and vomiting. He gradually became more drowsy his speech became thick, his breath uniferous and his face more and more oedematous. He complained of pain in the region of the right kidney of considerable thirst, and general restlessness. During the second week the condition gradually improved, and by October 12th he was on the way to recovery. During the fourth week he was sufficiently well to be invalided to England. The jaundice cleared up rapidly after admission to hospital, there was little oedema except in the face and a moderate accumulation of abdominal fluid early during the second week. The blood pressure remained approximately 120/80 throughout. The temperature was 104.5 F on admission, fell rapidly to 100° F and after the second day remained normal. The patient was given fluids, salt, glucose and sodium bicarbonate mostly by rectal tubes during the first two weeks. Frequent examinations of the

blood and urine were made throughout the course of the disease. The bio-chemical study is of interest in showing the lack of any acidosis, the very small amount of haemoglobin excreted by the kidneys, the extreme rapidity with which the haemoglobin disappeared from the general circulation, the extreme degree of nitrogen retention in the blood, and the striking impairment of renal function followed by recovery. Results of examination of the blood and urine are presented in tables.

[Records of this case are of considerable interest and importance and should be compared with those recorded by OWEN and MURGATROYD.]

W Y

OWEN (D Uvedale) & MURGATROYD (Frederick) *Clinical and Chemical Observations on Two Cases of Blackwater Fever.*—*Ann. Trop. Med. & Parasit.* 1928. Dec. 28. Vol. 22. No 4 pp. 503-530 With 6 figs. [48 refs.] [Liverpool School of Tropical Medicine, Liverpool.]

Clinical details are given regarding two cases of blackwater fever which occurred in the hospital of the Liverpool School of Tropical Medicine. Quantitative estimations of the haemoglobinaemia, bilirubinaemia, and the blood non-protein nitrogen were made. Special attention was given to the urine, and information is supplied on the following points, viz. quantity of urine passed, specific gravity colour reaction, deposits spectroscopic appearances, quinine excretion, bile pigments and salts. In addition, quantitative examinations of the urobilinogen, albumin, urea and haemoglobin were made. Every specimen of urine passed was examined in this manner and the data are collected into two tables. Neither case proved fatal, although one had suppression of urine for thirty four hours.

The following facts are worthy of notice —

1 The haemoglobinaemia in each case had apparently returned to normal within forty-eight hours of the commencement of haemoglobinuria.

2 Both cases gave a direct and indirect positive van den Bergh reaction.

3 Definite but temporary renal inadequacy was demonstrated in both cases by the non-protein nitrogen determinations.

4 No justification was found for the view that the specific gravity of the urine in blackwater fever was abnormally low.

5 Bile pigments and bile salts were absent in the urine in both cases.

6 Detailed records of the urinary excretion of urea for twenty-four days are given. The authors were unable to find in the literature any previous quantitative records.

7 The output of urobilinogen in the urine gave no indication of the onset of haemoglobinuria, since it was found to be no higher before the onset than in many cases of uncomplicated malaria. Extensive output did not extend into convalescence.

8 In view of the serious objections to all previous methods used for estimating haemoglobinuria in blackwater fever the authors devised a new method, based on the quantitative estimation of the iron content of the urine. This method is described in detail in the paper where emphasis is placed on its applicability to urines, however old they may be.

W Y

McCUTCHEON (Oliver) Note on the Endemicity of Blackwater Fever in the Bengal Duars.—*Report on a Mosquito-Malarial Survey of the Duars Tea Gardens* pp. 67-75 With 2 charts [13 refs.]

Blackwater fever has been known in the Bengal Duars for about forty years. Particulars of 382 cases occurring in the Duars during the five years 1921-25 have been placed at the author's disposal. These cases are classified, in a table according to nationality and the number of deaths which occurred in each group are given. Of 382 cases 217 were Bengalis with 52 deaths. The author remarks that this number is absolutely large and enormous in proportion to the babu population in the Duars which probably does not exceed 1000. Sex appears to have no influence on the incidence of the disease. Information is given regarding the seasonal incidence of malaria and blackwater fever and also of the length of residence of the patients in the Duars before they developed blackwater

W Y

Cox (E C) Epidemiology of Blackwater Fever in Siam.—*Amer J Trop Med* 1929 Mar Vol. 9 No. 2. pp 105-115 With 1 text fig [26 refs.] [McCormick Hosp Chiengmai Siam.]

After a very brief review of (a) the part played by malaria in black water fever (b) the production of a haemolysin, (c) the rôle of quinine in the production of haemoglobinuria, and (d) the question of a specific infectious agent the author passes to a consideration of certain epidemiological observations made by him in Siam.

The following summary is given —

"Blackwater fever before unknown in Siam, appeared in Chiengmai in epidemic form.

"The first epidemic was confined to practically one city block and to three family connections

The second epidemic occurred in a boys' school 4 miles from the city

A short time after the first epidemic sporadic cases 12 in all began to appear

The evidence would seem to point to a specific factor supposedly a malaria parasite but a variety capable of elaborating a potent hemolysin.

Prevention of relapse in a series of cases with neosphenamine without quinine would seem to suggest that this parasite was a variety of *Plasmodium vivax*. But it should be noted that these same observations from treatment alone might point to a spirochaete or a leptospira.

W Y

HILLEL YOFÉ De la fièvre hémoglobinurique en Palestine. [Blackwater Fever in Palestine.]—*Rev Méd et Hyg Trop* 1929 July-Aug Vol. 21 No. 4 pp 105-114 [15 refs.]

In this address the author conveys some impressions resulting from a study of the 260 cases of the disease he has had to deal with during 37 years work in Palestine

Of the 146 cases in which it was possible to go into the history of quinine in only 3 could he be certain that this drug had not been taken before the paroxysm. The author's observations on this point therefore support the general view that with rare exceptions the attack is precipitated by quinine. Of over 200 cases only 4 were persons indigenous to the country. Information is given regarding the

seasonal, sex and age incidence of the disease. The mortality varied greatly in different years according to the general conditions, the season and the treatment. The paper closes with a discussion of the treatment of the disease.

W Y

LICHTENSTEIN (A.) Bijdrage tot de kennis van de pathogenese der zwartwaterkoorts. [The Pathogenesis of Blackwater Fever.]—*Geneesk. Tijdschr v Nederl. Indië* 1929 Feb 20. Vol. 62 No 2. pp. 138-148. [30 refs.]

Founding his opinion upon clinical reports of cases of blackwater fever in which the characteristics of haemolytic jaundice were found (lowered resistance of the erythrocytes against hypotonic salt solution, bilirubinaemia without bilirubinuria, marked urobilinuria, the absence of bile salts in the urine) the author comes to the conclusion that blackwater fever is an acute haemolytic jaundice. The aetiological factor is always malaria infection either the malaria parasites may under so far unknown circumstances, acquire haemolytic properties or some other specific agent is necessary to cause haemoglobinuria in the malaria patient. In cases of moderate haemolysis the bile producing organs are able to alter all the affluent haemoglobin into bile pigment in case of abundant liberation of haemoglobin however the excess has to be excreted by the kidneys causing the symptom of haemoglobinuria. Blackwater fever may occur without urobilinuria. In such cases however large quantities of urobilin are found in the faeces.

W J BAA.

HEWETSON (W. M.) Blackwater Fever. An Interpretation of the Symptoms with a Suggestion for Treatment.—*Jl Trop Med & Hyg* 1929 June 15 Vol. 32. No 12. pp. 157-163. With 7 charts [3 refs.]

This paper is a condensation of an article read to the local division of the British Medical Association four years ago. The author quotes THORSON as stating that "The haemoglobin is evidently highly toxic, as witnessed by the severe rigors which accompany its liberation into the blood. There seems little doubt that the toxicity of the haemoglobin and the products of other dead tissue cells probably aid in the production of the rigors."

The author challenges these statements. He believes the symptoms are principally due to the toxicity of the bile. He finds that the appearance of the icterus and grave symptoms is simultaneous and in corresponding degree. The symptoms of a typical case are described in detail, and clinical notes of several cases are recorded. Blackwater fever is contrasted with such diseases as yellow fever and anaplasmosis in cattle in which jaundice is a prominent symptom. The main principles of the treatment in blackwater apart from the usual attentions to heart etc. are (1) evacuant, and (2) diluent.

(1) Mercury in one form or another is used. The object of mercury which acts chiefly on the duodenum and upper part of the jejunum, is to sweep the bile rapidly away from the upper intestine and thus prevent reabsorption.

(2) The author believes that the value of intravenous or subcutaneous injections is due not so much to their action in flushing the kidneys, as to their flushing the liver

The paper concludes with a theoretical discussion of the desirability of operation in selected cases. He believes that in cases other than suppression particularly in fulminating ones in which the chance of life is excessively remote, a large intravenous saline should be given immediately. If no definite satisfactory result is seen in about four hours, the gall bladder should be opened. The author states that if this operation is performed at all, it must be done early and not after fatal toxic effects have told on the heart liver and kidneys. He anticipates that the general effects of cholecystostomy would be an immediate cessation of the disastrous restlessness and vomiting and a clearing of the mental symptoms there would be none of those so-dangerous relapses

W 1

PATERMI (Ludovico) Il rene emoglobinurico (Haemoglobinuric Kidney)—*Riv di Malarologia* 1928 Sept-Oct Vol 7 No 5 pp 659-689 [24 refs.] [English summary pp 844-845] [Spirito Hosp Sassia.]

The author has studied the kidneys of four cases of blackwater fever. He insists on the relative frequency of changes in the vessels and circulation of the glomeruli these changes are not of the nature of a real nephritis. The author does not consider that the mechanical blocking of the kidneys is responsible for the anuria. He considers that the presence of casts in the kidney is rather the result than the cause of the oliguria and that the disease itself exerts some influence on the function and structure of the kidneys the pathological changes of which do not depend upon the elimination of haemoglobin

W 1

HOEPLI (R.) Ueber degenerative Nierenveränderungen bei Schwarzwasserfieber [The Degenerative Renal Changes in Blackwater Fever]—*Arch f Schiffs u Trop Hyg* 1929 June Vol 33 No 6 pp 322-328 [10 refs.] [Inst for Ship & Trop Diseases Hamburg]

After referring to some of the previous work on this subject the author describes in detail his own observations on the kidneys of nine persons who died of blackwater fever at Hamburg. The following summary is given —

Among the nine cases of blackwater the kidneys of two showed a slight degree, and those of seven a more or less pronounced degree of degeneration of the epithelium of the convoluted tubules with displacement of epithelial cells

The displaced epithelium played a substantial part in the formation of the casts in the tubes of Henle and collecting tubes.

An escape of blood into the renal tubules was seen in only four cases and then only in small amount

These investigations do not support the view that the kidneys constitute the site of haemolysis in blackwater fever

[BARRATT and the reviewer recorded similar observations twenty years ago but Hoeppli is apparently ignorant of the fact as no reference to their papers is given]

W 1

TALLANIDIS (Pr Panos) Zur Behandlung des Schwarzwasserfiebers. Vergleichende Untersuchungen aus dem Zentralkrankenhaus für Flüchtlinge in Saloniki. [The Treatment of Blackwater Fever. From the Refugee Hospital, Salonica.]—*Arch f Schiffh u Trop Hyg* 1928, Dec. Vol. 32, No 12, pp. 607-609

In the Central Hospital for Refugees at Salonica there have been during the last four years 80 cases of blackwater fever. In every case spirochaetes were searched for unsuccessfully. Most of the attacks occurred in the autumn months (37 cases) in January 12 cases, and only very few in the remaining months. The majority (57) were manual workers and men in a poor state of health amongst these the mortality was high (49 per cent). 27 cases were women and the mortality was 18 per cent. Most of the patients had taken quinine, some in small quantities daily the remainder only when they had fever. Occasionally single large doses were taken either in the evening or during the morning.

From the point of view of prognosis, it seems of importance whether the blackwater was accompanied by fever and whether or not parasites were present in the peripheral blood. Of 8 febrile cases with parasites, 5 (62.5 per cent) died whilst of 51 febrile cases without parasites, only 18 (35.3 per cent) died. The final cause of death in all cases was uraemia. The results of attempts at treatment can be summarized as follows—

1. Of the 10 cases which were treated symptomatically with serum, haemostatics, cardiac tonics etc. 8 (80 per cent) died.
2. Of the 30 cases which were treated with quinine 21 (70 per cent) died.
3. Of the 14 cases which were treated with plasmochin, 2 (14.3 per cent) died.

W 1

ARAVANTIKOS (Aparatase) Pathogenèse et traitement de l'hémoglobinurie paludéenne. [Pathogeny and Treatment of Malarial Haemoglobinuria.]—*Medicina Paises Celidos*, Madrid, 1929, July, Vol. 2, No 4, pp 334-335

The author believes that there is only a malarial haemoglobinuria and that the term bilious haemoglobinuric fever should disappear as it conveys the impression of a disease apart from malaria.

Haemoglobinuria is due to an abnormal activity of the reticulo-endothelial system. This hyper activity is the result of more or less prolonged malaria and manifests itself clinically by haemoglobinuria, which is precipitated either by an attack of malaria or by the administration of quinine or some other drug. In the first case quinine cures the attack of haemoglobinuria, whilst in the latter it is contraindicated.

As a result of experience in the treatment of 15 cases, the author states that the treatment of blackwater should take two lines. First the treatment of the haemoglobinuric paroxysm, and secondly the

treatment of the malaria. For the haemoglobinuria he advises the intravenous injection of a colloid with a view to blocking the reticulo-endothelial system. Such a procedure sometimes acts like a charm. With a view to preventing the suppression of urine he advises the intravenous injection of novasurol or the intramuscular injection of salyrgan. He states that the kidneys in blackwater tolerate both these mercurials well. With regard to the treatment of malaria which is necessary in order to prevent a relapse of haemoglobinuria, the author recommends desensitization of the patient in the following manner. An intravenous injection of a small quantity -0.5 gm. to 1 gm. of quinine should be given between two injections of a colloid with a view to blocking the reticulo-endothelial system. He declares that usually the first injection provokes an attack of haemoglobinuria. Two or three days later a second injection of quinine is given. This should be larger than the first if the haemoglobinuria was not intense. In the ordinary course three or four injections suffice to desensitize the patient and then quinine can be given by the mouth in the ordinary way.

W Y

COOKE (W. Ernest) & WILLOUGHBY (Hugh). *Note on the Use of Intravenous Sodium Bicarbonate Solution in the Treatment of Blackwater Fever*—*Lancet* 1929 Feb 16 pp 334-335 [3 refs]

Details are given of two cases of blackwater fever which were treated by intravenous injections of sodium bicarbonate solution, as recommended by HANSCHALL [see this *Bulletin* Vol. 24 p 667].

The following are the comments on the cases—

- 1 Both cases were negative to tests for paroxysmal haemoglobinuria.
- 2 As both patients were of continental nationality and accustomed to alcohol, champagne was given daily in small quantities without adverse effects.
- 3 Case 1 had two intravenous transfusions and even though he was an older man and had had in addition the shaking and disturbance of an ambulance journey at the height of the attack, his urine cleared more rapidly than did that of Case 2, and he did not have such severe haemolysis. In his case the second transfusion, indicated on account of the subnormal temperature and lack of appreciable improvement in the urine may have been the determining factor in obviating the persistence of the haemolytic process. In Case 2 the urine took longer to clear and there was a more severe haemolysis, but only one transfusion was given. The second transfusion was withheld, as the temperature was approaching normal and rectal salines were being well retained.
- 4 Both cases gave a negative result to the Wassermann test, and there were no signs of any intercurrent disease.
- 5 Judging from the results of these two cases it appears that immediate transfusion with sodium bicarbonate solution is indicated in all cases of blackwater fever to curtail the duration of the attack, to prevent blockage of the kidney tubules and to avoid suppression of urine.
- 6 More than one transfusion may be needed and should be given when there is no appreciable improvement within the first 24 hours. The need for further transfusions should be judged by the progress of the case.
- 7 Although rigors and further haemolyses may occur after transfusion the effect on the urinary system fully justifies the measure but should signs of anaemia appear blood transfusion must be employed instead, and this must be from a donor who is not taking quinine.

W Y

- I. CHESTERMAN (Clement C.) The Treatment of Blackwater Fever by Oral Sodium Bicarbonate.—*Lancet* 1929 June 29 pp. 1355-1356 [1 ref.]
- II. DONNISON (L. P.) Bicarbonate for Blackwater Fever. [Correspondence].—*Ibid* July 6 p. 47

I. Details are given of a case of blackwater fever treated by large oral doses of sodium bicarbonate. The author states that the following points are of interest in this case —

(1) Both in the initial attack and the relapse the disappearance of haemoglobin from the urine which was formerly acid, followed a few hours after it showed an alkaline reaction. (2) This was effected solely by the oral administration of sodium bicarbonate (and the citrates of lemonade) in doses up to 21 g in 24 hours. Ebbons vomiting which caused rejection of the first few doses was controlled by frequent sips of this alkaline fluid. (3) The relapse on the tenth day followed a couple of 0.6 g (10 grains) doses of quinine when the urine was acid, whereas 1.2 g (20 grains) was taken with impunity ten days later when the urine was kept alkaline. (4) Sodium bicarbonate in large doses is easily detected in the urine by the effervescence of CO_2 caused by the addition of an acid. The haemoglobin in such urine gives a very slight cloudy precipitate on boiling, whether previously acidified with acetic acid or not, possibly on account of the formation of alkaline haematin. Nitric acid, however, throws down a heavy cloud.

Although in this case the illness was precipitated by quinine it was definitely not a case of quinine haemoglobinuria, for the patient showed no sign of quinine idiosyncrasy before or after the attack. Moreover its association with an enlarged spleen, bilious vomiting, and jaundice leaves no doubt that it was a case of true blackwater fever. The case can be written down as but of slight severity: only on the ground that it continued for so short a period, and it is suggested that the early treatment, within six hours of onset, definitely aborted what might have been an attack as serious as the first one.

Such simple treatment is available immediately for any sufferer however far removed from medical attention. The pre-blackwater state should similarly be treated with small doses of quinine combined with generous doses of alkali taken some hour or so before. It is hoped that medical men practising in endemic areas will make known the possibility of such treatment of this dangerous and much dreaded disease and will report in confirmation or failure as results occur for any single practitioner has as a rule to wait some years in order to collect a series of cases."

II. This letter is written in support of the statement by CHESTERMAN regarding the value of oral administration of bicarbonate of soda in blackwater fever. The author apparently treated two cases successfully by this means.

W. I.

Br	P (S. J.) Observations on 8 Cases of Blackwater Fever treated with Alkalies.— <i>Ibid</i> No. 10. pp. 573-574	Blackwater Fever treated Oct.
Ti	gives a few statistics as to common when malaria was a infection seen by him, of a method of treatment	at 100 per cent. of cases
cases 1 cent.		at 100 per cent. of cases
Details		venous

injection of anti-streptococcic serum and oral administration of large doses of alkali which, in the author's opinion was of benefit to the 8 patients on whom it was tried.

W Y

Low (G Carmichael) COOKE (W E) & MARTIN (P H) **Blood Transfusion in Blackwater Fever**—*Lancet* 1928. Sept 29 pp 645-647 [5 refs] [Hosp Trop Diseases Endsleigh Gardens, London.]

Low states that an experience of 28 years both abroad and at home has led to the conclusion that apart from careful nursing and attention there is no specific treatment for blackwater fever. Many drugs have been lauded from time to time only to fall into disfavour and disuse.

The main causes of death in blackwater fever are (1) syncope (2) acute haemolysis (3) suppression of urine (4) hyperpyrexia and (5) asthenia. In the last type of case the urine clears but the patient does not improve the blood does not regenerate and gradually a semi-comatose condition intervenes and death takes place.

In a recent case of this type blood transfusion was tried. A detailed account of the case is given. The patient who was apparently at the point of death made a good recovery. Reference is made by MANSON BARR and SAYERS [this *Bulletin* Vol 24 p 650] to the record of a somewhat similar case. It is concluded that transfusion of whole blood at the time of or immediately after an attack of blackwater fever provides us with a new and useful therapeutic measure in the treatment of certain types of the disease.

With regard to the actual and theoretical effects of blood transfusion in blackwater fever the authors write as follows—

1 It undoubtedly treats anoxaemia symptomatically by helping to replenish the patient's supply of red blood cells.

2 It acts as a stimulus to blood cell formation. There may or may not be an adequate stimulus already provided but in our case the rise in the number of red cells per cubic millimetre coincided with the time at which blood rejuvenation occurs in other diseases after blood transfusion.

3 The urine in blackwater fever is loaded with albumin. The introduction of healthy blood plasma is probably advantageous.

4 It dilutes the haemoglobin and the bile pigment already free in the plasma and so may aid the kidney in its work of excretion.

5 It replenishes blood volume without unduly increasing the amount of sodium chloride. BAKER & DODDS⁴ have shown in their work on obstruction of renal tubules during the excretion of haemoglobin that a percentage of more than about 1 of sodium chloride is a very important factor in causing coagulation of haemoglobin, and therefore tends to cause suppression of urine. Further Dr J G THOMSON in conversation with one of us (P.H.M.) has recounted how disappointing and sometimes even disastrous were his results in treating blackwater fever in S Rhodesia with intravenous salines. This was of course before the publication of the work of BAKER & DODDS in 1925⁴.

6 It provides the most natural antidote possible to the acidosis and the acid urine which BAKER & DODDS have shown in the same paper to be so very important in causing coagulation of the liberated haemoglobin.

It is noteworthy that in our case in spite of the alkali treatment which was carried out from the start of hospital treatment, the urine was still acid to litmus on the second day—after nearly 24 hours treatment.

⁴ S. L. Baker and E. C. Dodds; *Bris Jour Exper Path* 1925 vi 247. See this *Bulletin* Vol 24 p 664.

7 It provides such antibodies as the donor may have in his blood against organisms which are likely to cause intercurrent infection—e.g. lung complications

8. It does not appear to lead to further hæmolytic, provided the bloods are carefully matched. Autoagglutination has been observed by us in severe malarial infections, and demands the utmost care to keep the temperature of the ingoing blood and of the receiving limb as near normal as possible

9 Whether there is any specific therapeutic action against *P. falciparum* is very doubtful

W Y

STERCKX (F) Un cas d'hémoglobiniurie grave traité par transfusion du sang. [Case of Severe Haemoglobinuria treated by Blood Transfusion.]—*Ann. Soc. Belge de Méd. Trop.* 1928 Sept. Vol. 8. No. 2. pp. 161-163

The patient was injected on July 31st, 1927 with 250 cc. of serum glucose shortly after he had commenced an attack of blackwater. Examination of the blood revealed an intense malarial infection: the author remarks that three-quarters of the red cells contained parasites. The next day as the urine was still black, the injection of serum was repeated. At midday the contents of one ampoule of antivenom serum was injected intravenously. The state of the patient was now worse: the temperature remained at 39.5 °C, the urine was black and scanty and the pulse feeble. The injections of physiological serum were continued and injections of caffeine and camphorated oil given. During the following night of August 2nd, the urine cleared temporarily and the previous treatment was continued, the injections of serum being repeated at intervals of two to three hours. The next day the urine was very scanty with an enormous deposit. An intramuscular injection of antivenom serum was given. About 1 p.m. bilious vomiting set in and the pulse was hardly perceptible. The patient was considered to be on the point of death. In view of the desperate situation the author decided to try transfusion of blood: 100 cc. of blood was mixed with a solution of 10 per cent. citrate and an attempt made to inject it intravenously but after 45 cc. had been injected the attempt had to be abandoned owing to obstruction of the needle. Violent reaction followed, and it was feared that the patient was dying. Subsequently however the patient passed fair quantities of clear urine. It was decided to give a second transfusion shortly after midnight, and 100 cc. of blood was given. After this the patient began to recover. The author considers that the transfusion saved him.

W Y

CAMBRÉSIÈRES (H.) & WESTPHAL (F). Fièvre bilieuse hémoglobino-risque et quinine. [Blackwater Fever and Quinine.]—*Rev. Méd. & Hyg. Trop.* 1928 July-Aug. Vol. 20. No. 4. pp. 97-102. With 1 chart

Details are given of a case of blackwater fever which was treated with quinine. During his first tour in the Ivory Coast in 1923-1924 the patient, who was 29 years of age, had two slight attacks of malaria. During his second tour in 1928 he had rather severe attacks of malaria, followed in June of the same year by a mild attack of blackwater fever. During this tour he had taken prophylactic quinine regularly. On March 17th, 1927, he set sail for France and when on the ship he stopped quinine. On April 4th, 1927, he commenced with a series of acute attacks of malaria and recommenced quinine 1 gm. per day for 3 days. *P. vivax* was found in the blood. Up to April 10th he took 0.5 gm. quinine daily and then 0.25 gm.

to April 22nd. On the morning of this day, as he didn't feel so well, he took 0.5 gm., and about midday another dose of 0.25 gm. At 1 p.m. the temperature rose rapidly to 40° C. and at 3 p.m. he passed black urine. During the next two days he exhibited the classical signs of blackwater fever. On April 23rd the patient had two paroxysms of fever, one at 6.45 a.m. and the other at 2 p.m. At 5.30 p.m. an injection of 0.25 gm. of quinoform was given. Half an hour later there was a further paroxysm, and at midnight a second injection of 0.2 gm. of quinoform was given. At 2.30 a.m. on April 24th there was another very violent paroxysm and a third injection of quinoform was given at 7 a.m. An hour later there was a further paroxysm but it was distinctly milder. Further injections were given but were not followed by paroxysms and the temperature gradually subsided to normal.

There follows a brief discussion of the case which adds nothing definite to knowledge. [Somewhat similar cases were recorded twenty years ago by BARRATT and the reviewer and others are to be found scattered throughout the literature.]

W Y

GEKOSE (Giovanni) Contributo allo studio della emoglobinuria nella malaria dei bambini [Blackwater in Children].—*Pediatrics* 1928 May 1 Vol. 36 No 9 pp 465-480 [Inst. Clin Pediatrics, Univ Rome]

The case here recorded is interesting since blackwater fever is believed to be rare in children. The patient, a boy 5 years of age had never been far from Rome and first came under observation for pleurisy with effusion. The Von Pirquet test was positive. A month later a sharp attack of malaria lasting 24 hours was succeeded after an apyrexial interval of 8 hours by a second chill and dark red urine was passed. Jaundice was present and the child was obviously very ill. Subtertian parasites were found in the blood. He was given large doses of calcium chloride (1 gm.) and injections of camphor and digalen, and quinine hypodermically. The urine became almost black and the quinine injections were replaced by the tannate (1 gm.) *per os*. The second attack of fever lasted for 26 hours and after an apyrexial interval of 10 hours was succeeded by a third. Improvement then set in and convalescence was established in a fortnight, the quinine and calcium being given throughout. The author lays great stress in the value of calcium chloride in large doses in the treatment of malarial haemoglobinuria, in which condition, he states, the blood calcium is below normal. He has given as much as 8-10 gm. in the day.

H Harold Scott.

GARY (C G) Quinine Intolerance in an African Child.—*West African Med J* Lagos 1928 July Vol. 2. No 1 p 96 With 1 chart facing p 109

The patient was the daughter of a native hospital dispenser at Opobo. Up to the age of four she was given quinine in one grain doses without ill-effects when she had fever.

In 1927 when she was four years of age she was given 2 grains of quinine in a single dose on one occasion when she was out-of-sorts. Four hours later she had a rigor the temperature rose to 105° F. and haemoglobinuria occurred. The condition lasted two days. In February 1928 she was again given quinine because of fever and again she developed haemoglobinuria. This attack lasted four days. In May the author gave her two tablets of plasmoquin compound (plasmoquin and quinine) not because she had fever but simply with a view to testing the drug. Within four hours she had a rigor and passed blood-red urine. The temperature rose to 101.4° F. and the attack lasted 24 hours.

W Y

DUPUY (H) Un cas de fièvre bilieuse hémoglobinoïdique de nature nettement paludéenne, traité par le stovarsol. [A Case of Blackwater Fever treated by Stovarsol].—*Bull Soc Path Exot* 1928, Oct. 10, Vol. 21 No 8, pp 636-637

Details are given of a case of chronic malaria, in which the patient suddenly developed blackwater after he had undergone 4 days quinine treatment. Quinine was stopped and the patient treated with intravenous injections of 30 cc. of antivenom serum. First the urine became more clear but a day or so later it became black again. Examination of the blood showed numerous schizonts of *Plasmodium* *tinax*. The injections of serum were continued but the condition of the patient grew worse and the anaemia rapidly increased. On the 5th day the urine had become clear, but the temperature remained high. A dose of 1 gm. of stovarsol was given daily for 3 days and then $\frac{1}{2}$ gm. daily for 9 days. The temperature rapidly returned to normal, and the patient quickly recovered.

W Y

NAO (S C) Retention of Urine in Blackwater Fever.—*Indian Med Gaz* 1929 Sept. Vol 64 No 9 pp 503-506

The author states that he has encountered retention of urine apart from suppression in 5 of 38 cases of blackwater fever. He concludes that, while suppression of urine is likely to occur in a case of blackwater fever when sufficient fluid is not given, retention of fluid is not uncommon when, during the course of the disease a large amount of fluid is given and the patient is exhausted.

W Y

WHITMORE (Eugene R.) The Blood in Blackwater Fever.—*Seventeenth Ann Rep Med Dept United Fruit Company Boston Mass* 1928, pp. 123-137 '7 refs.]

This paper deals with Laboratory Studies on cases of blackwater fever and more particularly with blood examinations. The study consists of typing, coagulation time determinations, studies of the blood picture tests of the resistance of the red blood cells to hypotonic salt solution, saponin and cobra venom, tests for hemolysis and quinine haemolysis and blood chemistry determinations. All the patients were Cuban, except one Cuban mulatto and one Barbadian.

Typing—Scanty reports of blood typing in blackwater fever indicate that there is no relation between blood type and susceptibility to the condition.

Flocculation test—The results of the Kahn test are set down in tables. Positive results occurred both in controls and in the blackwater cases, and probably these are syphilitic.

Coagulation time—This was determined by the capillary tube method. In no case was there any departure from the normal. The results of the examination of the individual cases are given in tables.

Resistance of the erythrocytes to hypotonic salt solution—The ordinary technique was followed and it was found that when fresh red cells were washed and used at once or when fresh blood was dropped directly into the tubes, there was no difference in the resistance of the red cells of the cases and those of the controls.

Resistance of the erythrocytes to saponin—For these determinations, dilutions of saponin from 1:35,000 to 1:46,000 were used, and measured quantities of fresh washed red cells were added to each tube. No difference was found between the resistance of the blackwater red cells and those of the controls.

Resistance of the erythrocytes to cobra venom—For these determinations dilutions of cobra venom of 1 10 000 1 15 000 1 20 000 1 30 000 and 1 40 000 were used, and a measured quantity of fresh washed red cells added to each tube here again, no difference was found in the resistance of the blackwater red cells and those of normal persons.

Test for serum haemolysins and quinine haemolysis—The cold haemolysin test was negative as also was Ehrlich's test. The question of the part played by quinine in blackwater fever renders it important to consider whether quinine exerts any haemolytic action on the red cells of cases and subjects of blackwater fever. In no case did the author find any indication that quinine hydrochloride in a dilution of 1 2,000 exhibited a haemolytic action either in mixtures of serum and red cells or in mixtures of red cells and salt solution. In two cases 0.2 cc. of 1 1 000 solution of quinine hydrochloride was injected intradermally there was no reaction of any kind.

Blood picture—The study of the blood picture of a severe case is shown in tabular form. In this table information is given regarding the red cell count the leucocyte count and differential leucocyte count.

Blood chemistry—As the author was not equipped for blood chemistry determinations in 1927 he attempted to preserve whole blood by the addition of 20 mgm. of sodium fluoride per cc. the sera were placed in ampoules and carried back to Washington for study. The results of the examinations of these bloods and sera are recorded in a table from which it appears that it is not possible to get satisfactory results from determinations on such material when kept for a period of several months. In 1928 the non-protein nitrogen, uric acid, urea, creatinine, and sugar determinations were made as soon as the blood was taken the alcohol-ether extracts for cholesterol and lecithin were made promptly evaporated to dryness and the dried residues taken to Washington and examined there. The trichloroacetic acid filtrates of the sera were carried to Washington where the calcium and inorganic phosphorus determinations were made and whole blood was also taken to Washington and the phosphorus determinations made there. The results of the 1928 determinations are also given in a table.

Carbon dioxide combining power of the blood plasma—It has been noted by BERGHAUSEN (1912) that the blood serum contained haemoglobin when blood was obtained for a Wassermann by constriction above the elbow—producing passive congestion. BERGHAUSEN studied the haemolytic action of carbon dioxide and also of the salts in the blood from this work he suggested that cold, trauma and passive congestion which lead to an attack of haemoglobinuria, may be associated with the production of an excessive acidity in the tissues and that the organic acids thus formed may play a part in the haemolytic process.

Applying this idea to blackwater fever Whitmore considered it advisable to examine the blood of cases in order to determine whether there was an association of acidosis in this condition. He investigated the carbon dioxide combining power of the blood plasma in two cases of blackwater and obtained evidence of mild acidosis in both cases. The article concludes as follows—

"No conclusions are drawn, and no suggestions are made. It is recognized that more material must be collected before one is justified in making any suggestions. The work is in progress and this is merely a progress report."

BENEDETTO (de Luca) La plasmochina nell'emoglobinuria da chintao [Plasmochin in Quinaius Haemoglobinuria.]—*Riforma Med* 1929 Aug 17 Vol. 45, No 33 pp 1124-1126 [8 refs.]

Brief notes of fifteen cases are given to show that plasmochin is not only safe to prescribe but certain in its action in patients who are suffering from blackwater fever or who have a return of malaria subsequent to such an attack.

H Harold Scott.

RIGHT SMITH (R. J) Recovery in Blackwater Fever after Blood Transfusion.—*Med J Australia* 1928 July 28 15th Year Vol. 2 No 4 p 120 [1 ref.] [Walter & Eliza Hall Inst. of Research, Melbourne Hosp Melbourne]

Clinical details are given of a case of blackwater fever which recovered after transfusion with 600 cc of citrated blood

W Y

RAMJEVA. Traitement de la fièvre bilieuse hémoglobinurique par la collobiase de quinine [Treatment of Blackwater Fever by Collobiase of Quinine.]—*Marseille Méd* 1928 Dec. 5 Vol. 65 No. 34 pp 896-898 With 1 chart in text.

An account is given of a case of blackwater fever from which the author draws the conclusion that collobiase of quinine has a specific action on the disease

W Y

MORALEX (Pitarque A) Fièvre bilieuse hémoglobinurique provoquée par la quinine chez un paludéen [Blackwater Fever provoked by Quinine.]—*Mond Méd* 1927 Aug. 15 Year 57 No 712 pp 780-783

This article describes in considerable detail the clinical history of a case of blackwater fever and calls for no special note

W Y

LEPROSY

DE LANGEN (C. D.) & HERMANS (E.) La diffusion géographique et le problème de la lèpre [Geographical Distribution of Leprosy]—*Meded. Dienst d' Volksgezondheid in Nederl.-Indië* 1929 Vol. 18. No 1 pp 208-220

This instructive report was submitted to the Health Section of the League of Nations. The epidemiology of the disease is first discussed, from which the authors conclude that the disease is contagious through the entry of the bacillus through the skin, but only in certain phases of short duration they think superinfection may occur. Treatment and the regulation of the lives of lepers have become more important than isolation, as they allow the patients to be found in the early and favourable stages—a certain number will be cured and the serious cases will become less numerous. Special hospitals are required for the treatment of lepers in or near a large town—these will also assist early diagnosis and they consider that the chances of arresting the progress of the disease and even of cure is now great and that 50 per cent. of fairly early cases can be cured, a few of them spontaneously. *Lepra bacilli* may be found after death in the glands of those who have lived with lepers without development of evident clinical lesions.

The different systems of dealing with leprosy from compulsory or partial segregation with parole to no measures are next considered and they conclude that isolation of infective cases is of value but the infectivity varies greatly and is decreased by treatment—early diagnosis is of primary importance while lepers should not be treated as criminals. They therefore recommend that in the Dutch East Indies there should be compulsory notification by medical men and the native chiefs—all suspected cases should be reported on by a committee with a lay president and two medical assessors in each area, and a positive diagnosis should be made when necessary on clinical grounds in the absence of bacteriological confirmation—doubtful cases should be re-examined periodically but those declared to be lepers should be sent to a hospital. A central leprosy institute with hospital, laboratory and library should be established at Batavia for research and training leprosy workers for other centres and hospitals in central places where intensive treatment will be carried out and where voluntary cases will also be admitted and all infectious cases will be detained. Cases with a minimum degree of infectivity may live at home under supervision, as in the successful Norway system and be reported on yearly. The highly susceptible children should not live with infective cases and all children born in a leper institution should be separated from their parents as soon as possible while certain professions should be forbidden to lepers. A knowledge of the real degree of infectivity of lepers should be spread among the public and legal powers should be provided to allow highly contagious lepers to be isolated, while people coming from areas with high leprosy prevalence should be examined and cases of the disease prohibited from entry. There should be international collaboration to carry out such a system, with modifications to suit special conditions, and an international bureau if leprosy is to be properly dealt with.

L. Rogers.

than isolation and that in China attempts at compulsory isolation causes cases to be hidden, while many escape, 40 per cent. in one place with an iron wall. Physicians well trained in dermatology are required to deal with the disease.

L. R.

HUIZENDAA (Leo S.) Legislation and Leprosy—*China Med. J* 1929 May Vol. 49 No. 5 pp. 488-490.

China has no national leprosy legislation and in some countries leproseries are veritable prison houses, although it is now recognized that the disease is not nearly so communicable as tuberculosis and venereal disease. Isolation laws therefore should be reconsidered, and with education to calm society other more humane legislation will become possible.

L. R.

SCHWARZMANN (B) Beobachtungen ueber die Verbreitung der Lepra am Kaspischen Meer [Observations on the Spread of Leprosy on the Caspian.]—*Zent f Bakt I. Abt. Orig* 1929 June 28. Vol. 112. No. 6/8. pp. 458-460. [16 refs.]

The author concludes from his study that leprosy is brought into the Caspian and Caucasus areas exclusively from Persia and the spread is assisted by the proximity of the sea. He thinks that fish eating and unhygienic conditions of living play a part in the incidence of the disease, and also that flies and mosquitoes may easily become infected from the excreta of lepers.

L. R.

PUENTE (José J) Extracto de la memoria correspondiente al año 1928 Lepra, sífilis y venéreas. [Leprosy Syphilis and Venereal Diseases. From the Report of the Health Department, 1928.]—*Semana Med* 1929 Aug. 8. Vol. 36. No. 32 (1856). pp. 402-406.

The leper census of the littoral Provinces of the Argentine has been continued and 1 687 cases have been noted. 25 per cent. of these were in Capital Federal and 20 per cent. (333) in Santa Fé. The figures are not regarded as accurate for some cases in early stages have probably been overlooked, while a considerable number had been wrongly diagnosed as leprosy such as vitiligo keloid, psoriasis, traumatic neuritis, for example. The only hospital of any size where patients are received and treated is the Hospital Mutila "the small leprosanium of Corrientes and the asylum of Córdoba cannot be considered of practical use. Attempts to establish places for isolation meet with much opposition and the solution projected is the formation of "colonies" the proposed constitution of which is given. Other measures in view are leper maternity work, the care of the children of lepers, and dissemination of knowledge of the disease.

H. Harold Scott.

ARAUJO (H. C. de Souza) Como se combate a lepra em S. Paulo
[How Leprosy is dealt with in S. Paulo]—*Sciencia Med* 1929
Apr Vol. 7 No 4 pp 193-199

In S. Paulo there is an inspectorate of leprosy consisting of a Chief Inspector an Assistant Inspector two dermatologists two bacteriologists a pharmaceutical chemist five special sanitary inspectors ten laboratory assistants and eight visitors. Every effort is made to detect cases in an early stage and to undertake treatment as soon as diagnosis is confirmed. The main leprosarium is that of S. Angelo at present with 535 patients isolated but capable of maintaining 800. There are two others which are designed to serve definite zones. Figures are given to show the cost of upkeep.

H. Harold Scott

NEFF (E. A.) & SNODGRASS (Robert J.) Leprosy—an Unusual Case of Family Infection.—*Jl Trop Med & Hyg* 1929 May 15
Vol. 32. No 10 pp 137-138.

The authors report an instance—a family of Indians in Fiji in which a son contracted leprosy from a neighbouring friend, and from him his father mother and five of his six brothers and sisters got the infection and only one child who had left the household early escaped.

L. R.

LUENGO GARCIA (Fabian) Lepra.—Dos casos observados en la Kabila de Guezaua (Xauen) [Two Cases of Leprosy seen in Guezaua (Xauen)]—*Medicina Países Cálidos* Madrid. 1929 July
Vol. 2. No 4 pp 361-364 With 3 text figs

The first was a case of mixed leprosy of 3 years duration, the second a nodular case of 2 years duration. Treatment with antileprol proved very successful, 3 capsules daily and 2 intravenous injections weekly on which days no capsules were given. The ulcers cicatrized in 15 days and the drug was well tolerated, except for a troublesome cough coming on five minutes after the injections and lasting for 8-10 minutes.

H. Harold Scott.

CASAZZA (Roberto) Nota clinica sulle eruzioni acute nei lebbrosi con particolare riguardo all'eritema nodoso lebbroso [Acute Eruptions in Leprosy in Particular Leprous Erythema Nodosum].—*Giorn Ital Dermat e Sifil* 1929 June Vol. 70 Year 64
No 3 pp 529-558 [53 refs]

Two cases of leprosy are described fully and a brief reference is made to a third case in which the disease was manifested by eruptions resembling erythema nodosum. The first was a woman of 50 years who had contracted leprosy nine years before. Her case was peculiar in that she exhibited with remarkable regularity exacerbations of fever and fresh outbreaks of the rash at monthly intervals. Much improvement followed treatment with antileprol. In the third case the eruption shortly preceded death. The author discusses the possible pathogeny of this manifestation, but without coming to any definite conclusion.

H. Harold Scott

with myriads of lepra bacilli. Similarly in strong early nerve cases iodides may be used cautiously, but many early nerve Al cases do not benefit by it. Experience at Bankura has shown that lepers do not improve more rapidly on iodides while many deteriorate and become weaker so they should only be used in strong patients and should be stopped if any weakness occurs and should rarely be continued for long, since a single reaction resembling protein shock may be beneficial, but repeated reactions harmful. Again, in cases apparently cured it is generally better not to risk producing a flare up by large doses of iodides, but to leave well alone and it is also doubtful policy to give large doses as a diagnostic measure in those who have been exposed to infection.

L. R.

STÉVENEL (L.) Le principe actif de l'huile de chaulmoogra. [Active Principle of Chaulmoogra Oil.]—*Bull. Soc. Path. Exot.* 1929. May 8. Vol 22. No. 5 pp 338-341

Commercial chaulmoogra oil is reported to be toxic to frogs and lizards. The author found this property to reside in the hard tegument of the hydnocarpus seeds and not in the pulp, and he thinks this part is also most active therapeutically when dissolved in olive oil. This active substance he regards as a kind of phytosterine. [It will be recalled that E. Muir found the ethyl esters of olive oil to be therapeutically active in leprosy.]

L. R.

NEFF (M. E. A.) Ethyl Esters of *Calophyllum inegaliter*. A Preliminary Report on Results following their Use at the Central Lepet Hospital, Makogai, F.H.L.—*Jl Trop Med & Hyg.* 1929 Sept. 2. Vol 32. No 17 pp 241-243

Calophyllum inegaliter is a Fijian tree the nut of which contains fatty acids and the crude adulterated oil has for long been used locally as an embrocation. The author reports that he has made an ethyl ester of the pure oil by Muir's method, and has used it as a local application for pains and also as an injection. He found it less active in leprosy than the ethyl esters and sodium salts of hydnocarpus oil, but thinks that a combination of the latter with the new ethyl ester is somewhat more effective. Moreover the new preparation is particularly effective in nerve cases and especially in rapidly relieving nerve pains, examples being given of cessation of severe and prolonged pains within a few hours after its injection in doses of 0.5 to 6 cc. intramuscularly while no untoward effects have been noted beyond some tenderness at the site of the injection during two days.

L. R.

KIRBY SMITH (J. L.) Gold Sodium Thio-sulphate in Malignant Anæsthetic Leprosy.—*Southern Med. Jl.* 1929 July Vol 22. No. 7 pp 637-639 With 3 text figs.

A mild bacteria-negative leprosy skin infection was treated by six intravenous injections of 100 mgm. of this gold preparation with rapid improvement but on the patient being informed of the nature of her disease she disappeared so could not be followed up.

L. R.

PALDROCK (A.) Die CO₂ Schnee- und Lotionbehandlung der Lepra. [Carbonic Acid Snow and Lotion Treatment of Leprosy].—*Arch f Schiffs u Trop Hyg* 1929 Sept Vol. 33 No 9 pp 455-461

The author reports further on the carbonic snow treatment combined with gold preparations (see this *Bulletin* Vol. 25 p 207). He finds that preparations 2950 and 2949 are powerful in aiding the breaking up of the leprosy bacillus but the latter called lopian, is alone suitable for use in leprosy. Lopian can be given in larger doses than solganal, but considerable loss of weight, loss of appetite and intestinal derangement followed its use. The blood changes were similar with both preparations and the lipase increased to a similar degree. With smaller doses of lopian he thinks they will be equally effective.

L. R.

TRUFFI (Giovanni) La applicazione spinale di raggi X nei lebbrosi e nei tabetici ed il loro meccanismo di azione. [Spinal Application of X Rays in Leprosy and Tabes, and their Mode of Action].—*Giorn Ital Dermat e Sifil* 1929 June Vol. 70 Year 64 No 3 pp 573-584 [36 refs.]

The analgesic effects of X rays have been known almost since their first introduction into medicine. The author employed them on two tabetics with lightning pains and on eight lepers two suffering from the nervous form, two nodular and four mixed. He used from 20-30 per cent of the erythema dose applying them over the sites of the roots to which the painful areas would be referable and at varying intervals 10 to 20 days on four or five occasions. In some cases the pains were relieved after the first application and in all after the second. The relief was not permanent in the tabetics especially the pains tended to recur in 30-50 days but repeated applications procured further relief. Not only the pain but other symptoms were alleviated the ataxy of the tabetics was improved and the trophic lesions of the lepers. The question of the mode of action is considered whether due to indirect effects on the inflammatory accumulations at the nerve-roots the ganglia, or the vertebrae or to direct action on the somatic nerves but it is concluded that the results are ascribable to action on the sympathetic, analogous to the relief obtained by operation on these branches.

H. Harold Scott

KERR (Isabel) Notes on the Value of the Sedimentation Test in the Treatment of Leprosy.—*Indian Med Gaz* 1929 May Vol. 64 No 5, pp 247-249 [Victoria Leprosy Hosp Ditchpali, Nizam's Dominions]

The use of this test in the treatment of 120 cases of leprosy has shown it to be of great practical value. Muir's simple technic being used. (This *Bulletin*, Vol. 25 p 982.) A low sedimentation rate of 20 to 28 indicates good resistant power and that potassium iodide can be used safely in addition to hydnocarpates, but if the rate is high, such as 40 or more resistance is low and even small doses of KI may prove very harmful, so only hydnocarpates and tonics should be used. During treatment a rise of the index may continue after the clinical signs of a reaction have passed, and until it has fallen no further reaction-provoking treatment should be used. Hydnocarpates may

act as a tonic and reduce the sedimentation time and increase the patient's resistance as long as this drug produces the slightest reaction no KI should be given so the test furnishes a reliable guide to safe and beneficial treatment.

L. R.

WALKER (Ernest Linwood) *Some New Aspects of the Etiology and Endemology of Leprosy*—*Jl. Preventive Med.* 1929 May Vol. 3. No. 3. pp. 167-195. With 15 coloured figs. on 1 plate. [42 refs.] [George Williams Hooper Foundation for Med. Research, Univ. of California, San Francisco]

In this paper it is claimed that the leprosy bacillus has been cultivated and proved to be a soil actinomyces. It can best be summarized in the author's own words—

The confusion and doubt surrounding cultivation of the lepra bacterium are due largely to the pleomorphic and facultative acid-fast characters of this organism.

The acid-sensitive or partly acid fast coccoid, diphtheroid, and actinomycoid organisms, that have been cultivated repeatedly from leprosy are different stages in the life-cycle of the same organism.

Hansen's bacterium in leprosy lesions is probably the tissue stage of this pleomorphic and facultative acid fast lepra organism.

This organism cultivable from leprosy belongs in the genus *Actinomyces*, as now constituted, and is most nearly related to the facultative acid-fast species, such as *Actinomyces asteroides* and *A. capris*.

The difficulty of cultivation of the lepra bacterium, the failure of experimental infections of man with leprosy material, and many of the clinical and pathological peculiarities of the disease appear to be due, in part at least to the fact that the majority of the lepra organisms in the tissues of lepers are dead.

Actual proof of the identity of the actinomyces cultivable from leprosy with Hansen's bacterium in the tissues, like proof of the etiologic relation of Hansen's bacterium to leprosy would depend upon the experimental reproduction of the disease in animals. Notwithstanding the absence of such proof, the evidence in support of both relations is convincing.

The actinomyces of leprosy like other pathogenic actinomyces, is a soil organism probably of wide but irregular distribution, and is only a facultative parasite.

Leprosy probably is primarily an infection from the soil, presumably through wounds but contagion as a possible secondary mode of dissemination is not thereby excluded.

The bearing of these conclusions on methods of control of leprosy is obvious. It may ultimately be found that protection from soil-infected wounds, and proper cleansing and disinfection of contracted wounds, are at least as important as the segregation and isolation of lepers."

L. R.

GIORDANO (Mario) *Ricerche culturali in casi di lebbra*. [Culture Researches in Leprosy]—*Arch. Ital. Sci. Med. Colon.* 1929 Jan. 1 Vol. 10 No. 1 pp. 8-13. With 3 coloured figs. on 1 plate. English summary p. 13. [Inst. of Trop. Path. Univ. Bologna.]

The author claims to have obtained a culture of the lepra bacillus on the medium of Hohn from the blood of a leper rich in the parasites, and to have obtained vigorous subcultures of acid-fast bacilli in the form of a streptothrix.

L. R.

SILVEIRA (Fleury) & GOMES (J. M.) A reacção de Kahn na lepra. [The Kahn Reaction in Leprosy]—*Bol. Inst. Hyg. de São Paulo* 1929 No 39 7 pp

The authors carried out the Kahn the Wassermann and the Deycke Gomes reactions on 499 sera of patients showing clinically signs of leprosy without those of other diseases such as syphilis. The first proved much inferior to the second since WR was positive in 204 whereas the Kahn only in 75

In more detail, the following expresses the comparative results in tabular form —

Form of Disease	Kahn +	Wassermann +	No of Cases.
Nervous	7	20	79
Maculo-anaesthetic	6	10	34
Early	28	28	91
Mixed	30	121	265
Nodular	4	25	30
Total	75	204	499

II Harold Scott.

SILVEIRA (Fleury) & GOMES (J. M.) A reacção de Kahn sem cholesterina na lepra. [The Kahn Test without Cholesterin in Leprosy]—*Ann. Paulist. Med. e Cirurg* 1929 May-June. Year 17 Vol. 20 No 5-6 pp 50-53

Parallel tests were performed with the sera of 29 non-syphilitic leper patients by means of the Kahn without cholesterin and the Wassermann.

The results have been arranged as in the previous abstract and were as follows showing that the test deprived of cholesterin loses much of its value, 7 only out of 15 of the mixed form giving a negative.

Form of Disease	No	++++		+++		++		+		—	
		K	W	K	W	K	W	K	W	K	W
Nervous	2	0	1	0	0	1	1	0	0	1	0
Maculo-anaesthetic	7	0	1	0	0	4	3	1	1	2	2
Early	2	0	0	0	0	0	1	1	1	1	0
Mixed	15	0	0	3	6	1	3	4	0	7	6
Nodular	3	0	0	0	0	1	3	0	0	2	0
Total	29	0	2	3	6	7	11	6	2	13	8

II Harold Scott.

WILSON (R. M.) & GILMER (W. P.) Complement Fixation and Precipitation Test for Syphilis in Lepers.—*China Med J* 1929 May Vol. 43 No 5 pp 484-486

These tests in 637 lepers are compared with those on clinic patients in a hospital, using the Noguchi technique and the Kahn test and very similar percentages of reactions were obtained, the strongly positive reactions being 14 and 19 per cent. respectively L. R.

SCHLOSSMANN (K.) Vergleichende Studien über Lipoidstoffe der Leprabazillen, Tuberkelbazillen und der tierischen Organe. [Comparative Studies on Lipoids of Leprosy and Tubercle Bacilli.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Aug. 1. Vol. 62. No. 5/6. pp. 447-463. [54 refs.] [Bact. Inst., Univ., Dorpat Estonia.]

The author holds that it is still doubtful whether Hansen's bacillus has been cultivated, nor have serological reactions yet made early diagnosis and treatment possible, so that improved serological methods are required. As the result of his studies he obtained organic solutions of the extractable lipoids of 13 lepra bacilli cultures and from tubercle bacilli. The lipid materials thus obtained gave different chemical reactions, but they could not be differentiated by micro-chemical analysis. Complement fixation tests with 33 antigens were carried out with the blood sera of 63 sick and healthy persons, but they did not allow of the serum diagnosis of latent leprosy and the results were not conclusive.

L. R.

PALDROCK (A.) Die Blutgruppen der Lepraösen in Estland. [Blood Groups among Lepers of Estonia.]—*Arch. f. Schiff- u. Trop. Hyg.* 1929. Aug. Vol. 33. No. 8. pp. 440-446. [16 refs.]

Individual blood groups behave differently in the sexes and in relation to predisposition and the onset and course of the disease. Thus the O and B groups are more predisposed to leprosy—women are more predisposed than men in the B group. In the O group the disease appears earlier in life and females tend to be anaesthetic and males to be tubercular cases, but in A group both forms appear in either sex in the later years of adolescence. In the B group the disease tends to occur in either sex later in life and the cases run a more rapid course, especially in females. Should these blood group determinations be confirmed in a larger number of cases the conclusions will become important.

L. R.

MARRAS (Antonio) & FRAU (Alberto). Sulla tossicità dell'urina leprosa. [Toxicity of the Urine in Leprosy.]—*Giorn. Ital. di Dermat. e Sifil.* 1928. Dec. Vol. 60 (Year 63). No. 6. pp. 1665-1707. With 3 folding tables. [31 refs.]

Using rabbits as their experimental animals the authors made numerous observations of the results on the pupils, pulse, temperature, nervous system, etc. of the injection of urine from leper patients, and carried out post-mortem examinations. The results are recorded in detail in the text and also in tabular form. Fourteen leprosy individuals were taken, two of the nodular type, six anaesthetic, five mixed, and one incipient case. Their findings may be summarized by stating that the toxicity proved to be lower than that recorded by those who have worked with normal urine. This held good regardless of the type of disease of the period (whether during an exacerbation or a remission) and of the treatment. They maintain that though the bacillus gives rise to toxin and though there are renal changes found in leprosy the function of urinary secretion is not interfered with and elimination of the toxin takes place by some other means, notably the skin and the intestine. The production of toxic substances in leprosy

is a slow process so that the organism has time to deal with them by these other routes. They do not exclude the possibility that changes in the vegetative nervous system may play a part, perhaps a large part, directly and indirectly in metabolism and so bring about the hypotoxicity of the urine. This aspect of the question is to be further studied.

H Harold Scott.

- PERROV (V P) [On the Leprosy and the Care taken of the Lepers in the Surhan-Daria District of the Uzbekistan.]—*Pensée Méd d'Usbekistane* Tashkent. 1929 No 5 pp 19-37 With 2 text figs [160 refs.] [In Russian English summary pp 99-100]

The author states that leprosy is spreading widely in Central Asia, but there are no reliable statistics of the disease and vitiligo is confused with it.

L. R.

- SAROW (Tadashi) Distribution of Lepers and its Prevention in Japan.—*Jl Public Health Assoc Japan* 1929 June Vol 5 No 6 pp 1-12.

This paper deals with the same figures as in the review in this *Bulletin* and p 610 The provision of leper hospitals in Japan is described.

L. R.

- RORRO (A. H.) Sobre la transmision de la lepra a los monos inferiores. [Transmission of Leprosy to Lower Monkeys.]—Reprinted from *Rev Med Latino-Americana* Buenos Aires 1926. Nov Vol. 12. No. 134 7 pp with 3 coloured plates. French summary pp 7-8. [3 refs.]

The inoculation of monkeys with leprosy material produces only local tubercles without infection of the nasal mucous membrane or general lesions, with an incubation period of about 30 to 35 days.

L. R.

- STEIN (A. A.) [Sur la morphologie de la lèpre viscérale.] [The Morphology of Visceral Leprosy.]—*Arch Sci Biol* 1929 Vol. 29 No. 2 pp 135-166 [1 page of refs.] [In Russian. French summary pp 165-166]

The author describes the microscopical lesions in leprosy and states that by staining with Sudan III and carbollic fuchsin he demonstrated drops of lipid material in the leprosy cells.

L. R.

- ARAL (P) [Estudios serologicos en la lepra. Reserva alcalina.] [Alkaline Reserve in Leprosy.]—*Boi Tacn Dirc Gen Sanidad* 1929 Apr Vol. 4 No 4 [Summarized in *Bull Inst Pasteur* 1929 May 31 Vol. 27 No 10 p 435]

The blood of 1 anaesthetic and 9 mixed cases of leprosy was examined and the alkaline reserve was found to be normal.

L. R.

- FIGUEROA (Norbert) The Use of Fibrolysin in Leprosy.—*Indian Med Gaz* 1929 Aug Vol. 64 No 8 pp 426-429 [3 refs.]

The supposed effects of fibrolysin in dissolving fibrous tissue has been exploited in a number of cases of leprosy with completely negative results

L. R.

- FERRERIA (Isauro Costa) Etiologia e prophylaxia da lepra.—*Falco Med.* 1929. Sept. 5 Vol. 10 No. 25 pp. 308-311
- FERRERO (Michelangelo) Ricerche sulla lebbra.—*Arch. Ital. Sci. Med. Colon. Path. Univ., Bologna*]
- GALAN (Alfredo A.) Un nuevo tratamiento para curar la lepra.—*Repert. Med. y Ciruj. Bogota.* 1928. May Vol. 20 No. 5 (229) pp. 230-247
- HOFFMANN (W. H.) & RAMOS BARI (P.) Las infecciones latentes de la lepra.—Reprinted from *Jl. dos Chênicos.* Rio de Janeiro, 1928. Vol. 9. No. 21. 16 pp
- DA MATTA (Alfredo) Esboço historico da lepra no Estado do Amazonas (1839 a 1928).—*Science Med.* 1929 Apr Vol. 7 No. 4 pp. 181-192. With 6 figs. on 4 plates
- DA MATTA (Alfredo). Os symptomas iniciais das leproses. Seu contágio e evolução relativamente rapida.—*Science Med.* 1929 May Vol. 7 No. 5 pp. 233-249 With 6 figs. on 2 plates.
- MISERA (J. N.) O tratamento da lepra pelo vacinol.—*Bol. Ger. Med. e Farmacia.* Barrota. 1929 Jan.-Apr. Ser. 13. No. 1-4 pp. 35-38.
- SEMINARIO (C.) & GAVIÑA ALVARADO (E. R.) Lepra tuberculoida.—*Science Med.* 1929 May 30 Vol. 36. No. 22 (1845) pp. 1394-1398. With 1 text fig. [1 ref.]
- DE SOUZA-ARAÚJO (H. C.) Studies upon Leprosy I. Transmission of Human Leprosy to the White Mouse. (Reprinted).—*Inst. Oswaldo Cruz. Supplemento das Memorias* 1929 June 22. No. 8. pp. 122-127 With 7 figs. on 2 plates. [10 refs.] Reviewed in *T.D.B.* Vol. 28. p. 242.

MISCELLANEOUS

YEAGER (Clark H) **Practical Bored Hole Latrine Construction.**
Malayan Med Jl 1929 June. Vol 4 No 2 pp 45-55
 With 18 text figs.

Numerous requests have been received for information on the bored-hole latrine many of which are for construction details. Therefore this article has been prepared to answer the questions which have been asked and to assist those persons who are unfamiliar with bored hole latrine construction.

[Similar enquiries reach this Bureau and the article is therefore abstracted at some length. The illustrations are very poorly reproduced in the article but through the kindness of the Information Service of the Rockefeller Foundation it has been possible for the *Bulletin* to reproduce from original photographs.]

The general features of a bored-hole latrine are shown in Fig 1

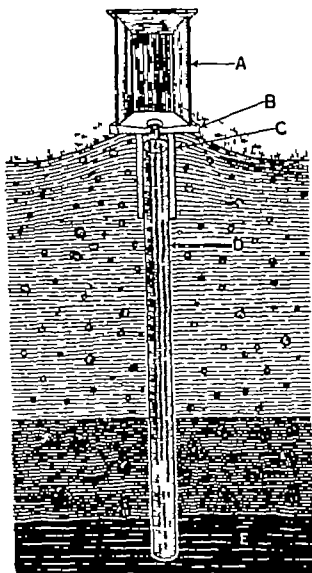


Fig No. 1—THE TUBE LATRINE.

A Superstructure B Cement slab C, Concrete cylinder usually
 not necessary D Bamboo basket for retaining soft earth, not
 always necessary E Water

- FERRERIA (Isauro Costa) Etiologia e prophylaxia da lepra.—*Folha Med.* 1929 Sept. 5 Vol. 10 No. 25 pp. 303-311
- FERRERO (Michelangelo) Ricerche sulla lebbra.—*Arch. Ital. Sci. Med. Colon.* 1928 Nov. Vol. 9 No. 11 pp. 647-676. [50 refs.] [Inst. of Colon. Path., Univ., Bologna.]
- GALAN (Miguel A.) Un nuevo tratamiento para curar la lepra.—*Report. Med. y Ciruj. Bogota.* 1928, May Vol. 20 No. 5 (229), pp. 230-247
- HOFFMANN (W. H.) & RAMOS BARR (P.) Las infecciones latentes de la lepra.—Reprinted from *Jl. dos Clinicas* Rio de Janeiro. 1928. Vol. 9 No. 21, 16 pp.
- DA MATTA (Alfredo) Esboço historico da lepra no Estado do Amazonas (1866-1928).—*Sciencia Med.* 1929 Apr. Vol. 7 No. 4, pp. 181-192. With 6 figs. on 4 plates
- DA MATTA (Alfredo) Os symptomas iniciaes das leproses. Seu contagio e evoluçao relativamente rapida.—*Sciencia Med.* 1929 May Vol. 7 No. 5 pp. 233-249 With 5 figs. on 2 plates.
- MIRRA (J. N.) O tratamento da lepra pelo smocinol.—*Bol. Ger. Med. e Farmacia.* Bastoa. 1929 Jan.-Apr. Ser. 13, No. 1-4 pp. 35-38.
- SEMINARIO (C.) & GAVIÑA ALVARADO (E. R.) Lepra tuberculoida.—*Semana Med.* 1929, May 30. Vol. 36, No. 22 (1846) pp. 1394-1396. With 1 text fig. [1 ref.]
- DE SOUZA-ARAÚJO (H. C.) Studies upon Leprosy I. Transmission of Human Leprosy to the White Mouse. (Reprinted).—*Inst. Oswaldo Cruz. Supplemto das Afecções* 1929 June 22, No. 8, pp. 123-127 With 7 figs. on 2 plates. [10 refs.] Reviewed in *T.D.B.* Vol. 28, p. 342.

(5) One tripod made from three 25-foot wooden poles or 1½ in pipe. This is for hauling up the auger full of soil (see fig 5)

(6) One 12 in pulley or gun block for hauling up auger. If necessary use a compound pulley.

(7) 50-60 feet of ¾-in rope with hook on end. To engage the hook a ring can be fastened to the shaft at any convenient place.

(8) One pair of wooden hinged doors on a frame 36 in square. In the free edge of each door is cut a semicircular notch. Once the auger has got down about 3 feet the frame with its doors is placed flat over the hole so that when the doors are closed down the shaft of the auger passes through the round hole made by the opposing notches. This steadies the auger during turning and makes it go down vertically.

(9) Twenty foot length of 1 in pipe with steel chisel riveted to the end. This is for breaking up soil too hard for the auger.

Method of Use

The tripod is set up over the site chosen. The cross is slipped over the shaft. The rope running through the pulley is hooked to the shaft. The auger is erected to the boring position. If necessary cut a small hole by spade removing roots etc. to give the auger a start this however is rarely necessary. Usually three turns fills the auger. Open doors pull up auger swing to side and empty (see fig 5).

Sometimes large stones can be broken by the long tool mentioned in (9) above. Sometimes a small man must be lowered down to bring up the stone by his feet or a loop of rope. Pouring in water is helpful in some soils.

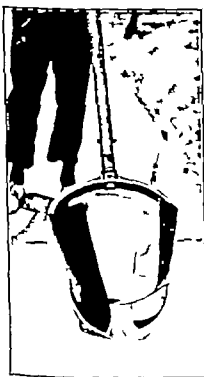


Fig 4 Auger bottom

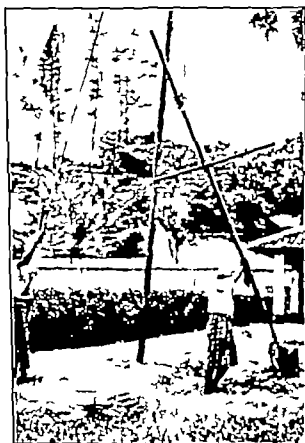


Fig 5 Tripod set up over chosen site for hauling up the auger full of soil.

Difficulties.

Sand sometimes requires the dumping of clay or mud into the hole to make the sand pack, or a lining may be pushed down as the work proceeds.

Rock would require special apparatus and the expense is generally not justified. If the rock is at 10 or 12 feet make that the final depth.

Water may necessitate pumping or baling.

Special sand augers are obtainable. A lining of basket work made of split bamboo has been found useful to prevent caving (see fig. 1). Where the surface soil is soft an empty barrel or 18-in. cement cylinder will support the walls of the hole at the top.

If surface flooding is expected the cement cylinder should extend 2 feet above the highest water level.

Floor of the latrine

A slab of reinforced concrete 30 by 38 by 2½ in. has been found satisfactory sloping to a hole about 10 by 6 in. at the centre.

Superstructure

This can be according to taste and local facilities.

Variations of tools and methods.

A number of these are suggested. For these the paper can be consulted, but many will occur to those putting the plan into practice.

J F C. H.

INDEX OF AUTHORS OR SOURCES

The bracketed abbreviations after the page numbers indicate the subjects.
Page numbers within brackets indicate papers not summarized

Am. signifies Amoebiasis and Amoebic

Bb.	Dysentery
BL	Beriberi
B.R.	Blackwater
B.R.	Book Review
Chl.	Cholera
C.Bu.	Climatic Bubo.
Der	Tropical Dermatology
Dys.	Dysentery (Bacillary and Unclassified)
Ent.	Enteric Fevers.
Fev	Fevers.
G.V.	Granuloma Venereum.
Hel.	Helminthiasis.
Hist.	Historical.
H.S.	Heat Strokes.
Jaun.	Infectious Jaundice.
K.A.	Kala Azar

Lab signifies Laboratory Reports.

Lep	Leprosy
Mal.	Malaria.
Misc.	Miscellaneous.
Myc.	Tropical Mycology
Oph.	Tropical Ophthalmology
Pel.	Pellagra.
Pl.	Plague
Rab	Rabies.
R.F.	Relapsing Fever and other Spirochaetoses
Sp	Sprue
S.S.	Sleeping Sickness.
Tb	Tuberculosis.
Und.	Undulant and Abortus Fever
Y.F.	Yellow Fever
Y & S	Yaws & Syphilis
Z.	Medical Zoology

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 Bacchelli, G., 202 (S.B.) 382 (Mal.) 789 (Z.)
 — with Franchini, 993 (Hel.)
 — & Taddia, (258) (Z.)
 Bachman, G. W. 581 (Hel.)
 Bachmann, N. 806 (Dys.)
 Badgualdo J., 977 (Hel.)
 Badger L. F., with Wayson, 337 (Lep.)
 Baer J. G. with Joyeux, 975 976 (Hel.)
 Baernmann, G. & Smits, H., 372 (Mal.)
 Bailly J., 221 225 (Rab.)
 Bailly with Remlinger 218, 222, 224, 736 Ms
 737 Ms (Rab.)
 Bailly J. D. with Young, 362 (Mal.)
 Bal, M. Z. 919 (Mal.)
 Baker C. E., with Stiles, 557 (Hel.)
 Baker J. E., 416 (Misc.)
 Bakker C., 605 (Oph.)
 Bakmin, L., 191 193, (724) (S.S.)
 Balado, M., with Arce & Dumitri, (357) (Hel.)
 — with — & Franks, (557) (Hel.)
 Balaschewa, M. T. with Marinkovskiy &
 Pickoval, 373 (Mal.)
 Balfour A., 414, 583 (Misc.) 857 (Y & S.)
 Balfour M. C., with Carley 919 (Mal.)
 Ballin, P. L., 335 (Lep.)
 Balli L., with Ciuca & Vlăra, 828 Ms,
 944 (Mal.)
 — & Gherasovici, I. 358 (Fev.)
 — & Lunovskiy, 381 (Mal.)
 Bancroft, P. with Tomlinson, 763 (Myc.)
 Banerjee, K. G. 14 (Mal.) 967 (Bb.)
 Banerji, B. K. 669 (Misc.)
 Barber M. A. & Komp, W. H. W. 15 (Mal.)
 — & King, C. H. 921 (Mal.)
 — & Newman, B. M., 699 (Mal.)
 Barbier G. (625) (Lep.)
 Barbieri, A., 247 (Z.)
 Barbosa, J. P., (1006) (Y.F.)
 Bardenwerper H. E. 850 (Hel.)
 Barg, I. with Bergman & Breyer 786 (Z.)
 Barlovatz, A., 573 (Misc.) 708 (S.S.) 803
 (Y & S.)
 Baroni, with Scuderi, 680 (Am.)
 Baroni, B. 756 (Myc.)
 Barrand, P. J., 254, (258) (Z.)
 — with Sinton 255 (Z.)
 Barret, H. P., with Smith, 231 (Z.)
 Barreto J. de B., 1008 (Y.F.)
 — & Ferraz, A. G., 650 (Y.F.)
 Barrett, J. W. 414 (Misc.)
 Barron, M., 975 (Hel.)
 Barroa, S., 800 (Z.)
 Barroso, S. (306) (Lep.) (1008) (Y.F.)
 Barrow J. V., 784 (Z.)
 Base, E., 656 (Hel.)
 von Basewitz, B. E., (344 Ms) (Lep.)
 von Basewitz, E. 106 (Der.)
 Bastal, P. (74) (Und.)
 — & Rotta, C. 63 (Und.)
 Baur B. C., 809 (Z.)
 Battistini, T. S. 850 (Fev.)
 Bauer J. H. & Hudson, N. P. 303 (Y.F.)
 — with — & Philipp, 647 (Y.F.)
 Baumann, H. D. 237 (Hist.)
 Baylis, H. A. 43* (B.R.)
 Beaumont, D. M., 661 (Misc.)
 Bedford, G. A. H., 805 (Z.)
 Beihefte zum Archiv für Schiffs- und Tropen-
 Hygiene, 676 (Am.)
 Bejarano, J. Rey G. V. & Abadía, G. (67)
 (Mal.)
 Beklemishev W. & Mitrophanova, J. 21
 (Z.)
 Belliard, S. J. 1023 (Bl.)
 Benarroch E., 366 (Mal.)
 — with Hall, 371 (Mal.)
 Benedetti-Valentini, F. (602) (Dys.)
 Benedetto, de L., 1030 (Bl.)
 Bensted, H. J. with Perry 867 (Dys.)
 973 (Hel.)

- Bequaert, M., with Walravens & Valcke 20 931 (Mal.)
 Berdnikov V 638 (Pl.)
 Bérénay, M. E., 330 (K.A.)
 Berger E. (842) (Fev)
 Berglund, H. with Yang 837 (Mal.)
 Bergman, A., Breyer A. & Barg, I 788 (Z.)
 Bergma, S. 114 (R.F.)
 Berman, P. & Leake, W. H. 565 (Misc.)
 Bernard P N (599) (Misc.)
 Bernd, M. 893 (Dys.)
 Bertwistle, A. P. 244 (Z.)
 Besemann, A. & Nells P 133 (R.F.)
 — & Thiry U 671 (R.F.)
 Bethes, O W 470 (Am.)
 Bethoux, L. 828 (Und.)
 Beva, W. M., (625) (Lep)
 Bensonova, A. 637 (Pl.)
 Bharadwaj A. C., (180) (Y & S)
 Bhattacharj, S P with Megaw & Paul 353 (Bb.)
 Bhattacharyya, P & Chowdhury S P R. 372 (Mal.)
 Bicalho N., with Flialho & Pacheco 300 (Y.F.)
 Bichkov V & Borzenkov A. 637 (Pl.)
 Bideau with Dargen, 671 (R.F.)
 Bideaux H (258) (Z.)
 Bigger W K. 6 (Mal.)
 Biginelli, P 378 (Mal.)
 Bigot, A. Eyraud R. & Vein H. 736 (Rab)
 — with Vein & Eyraud 737 (Rab)
 Bilbo L. with Figueroa 7 (Mal.)
 Billimoria, H. S. with Fairley & Mackie 419 (Sp.)
 Bird, W 10 (387) (Mal.)
 — with Sinton, 14 929 (Mal.)
 — with — & Eate 379 (Mal.)
 — with — & Orr 380 (Mal.)
 Bishop A. with Lakdaw & Dobell 469 (Am.)
 Bishop F L. with Meleney & Roberts, 919 (Mal.)
 Biset, W 743 (K.A.)
 Blackmore H. S. 631 (Hel.)
 Blake A. V. & Okell C. C. 482 889 (Dys)
 Blanc, G (842) (Fev)
 — & Caminopetros J 158 (Dys.) 327
 (h.A.) 433 833 838 839 840 (Fev)
 — — — — — Dumas J & Saenz, A. 838 (Fev)
 — — — — — Groud, P 839 (Fev)
 — — — — — Joannides G 781 (Misc.)
 — — — — — Manonassis E. 42 (Fev)
 Blanchard, M. & Pin, M. 848 (Mal.)
 — with Toullec, 829 (Und.) 882 (Am.)
 High-Peacock, N., 525 (Hel.)
 Bloch, B. 677 (Der)
 Bloch, J. I. (757) (K.A.)
 Bloomfield, A. L. & Wyckoff H. A. 496 (Sp)
 Bow T B 249 (Z.)
 Brummett, G 541 (Hel.)
 Brummett, W 562 (Misc.)
 Brak, R. & Carpenter C. M. 448 (Und)
 — with — 58 73 (Und.)
 Boase A. J. 852, (862) (Y & S)
 Bober, S., (Rab)
 Boeck, W. C., 144 (Am.)
 de Boer H. S. 35 (Mal.)
 Boettiger C. & Verne, J 896 (Hel.)
 Bogoyavlensky N. A. 918 (Mal.)
 — & Yampolskaya, (37) (Mal.)
 Bohh, S. W., 728 (Rab)
 Bolnet, Pieri, J & Dunan, 49 459 bis (Fev)
 Boletín del Instituto de Clínica Quirúrgica. Buenos Aires 78 (B.R.) 990 (Hel.)
 Boletín Oficina Sanitaria Panamericana 101 (Pl.)
 Bombay 398 (Lab.)
 Bonalberti E. with Ottolenghi & Brighenti, 913 (Mal.)
 Boncinelli U. with Favilli 72 (Und)
 Bonne C. 762 (Misc.)
 — & Roskott, E. R. A. L. 927 (Mal.)
 Bonnell H. E. with Sharby 576 (Misc.)
 Bonne-Wepster J. with Walch 806 ter (Z.)
 Bonura P. (387) (Mal.)
 Boquet, A. 275 (Z.)
 — & Dujardin-Beaumetz E. 639 (Pl.)
 Borchardt, W. 896 (Hel.)
 Borel E. 248 805 (Z.)
 Borel M. 5 (Mal.)
 Borzenkov A. with Bichkov 637 (Pl.)
 Bose J P 426 (B.R.)
 Bose K. 909 (Mal.)
 Botteri J. H. 541 (Hel.)
 Bouffard, G. & Legac P 818 (Z.)
 Boughton I B 736 (Rab)
 Boulay A. Lhuere L. & Mitard, L. 24 (Mal.)
 Bourgeois & Tsatsaronis 399 (Lep)
 Bourrian P 475 (Am.)
 Bourret M. with Vigne, 752 (K.A.)
 Boycott, A. E. 215 (Rab) 804 (Z.)
 Boyd G. H. 802 (Z.)
 Boyd M. F. 810 (Z.)
 Boyd, T. C. & Roy A. C. 330 (K.A.)
 Brahmachari U. & Sen, P B 559 (Misc.)
 Braun, H. & Well A. J. 479 (Dys.)
 Breder Jr C. M. with Godger 791 (Z.)
 Brendl, V. 800 (Z.)
 Breyer A. with Bergman & Barg 788 (Z.)
 Brighenti, D. with Ottolenghi & Bonalberti 913 (Mal.)
 Broden A. 22 (Mal.) 149 (Am.)
 Brooks S. C. with Enlow 484 (Dys.)
 Broquet, C. 427 (B.R.)
 Brosius O T 15 (Mal.)
 Brotru G. 71 (Und.)
 — with Ottolenghi 823 948 (Mal.)
 Brown H. W. 548 (Hel.)
 Brown P. W. 148 (Am.) (165) (Dys.)
 Bruchmann, C. A. & de Nucci L. S. 487 (Dys.)
 Brug S. L. 253 812 (Z.) 546 (Hel.)
 Brugi A. 449 (Und.)
 Brulé Laporte & Ragu, 880 (Am.)
 Brumpt, E. 230 524 (Z.) 532 (Hel.)
 — & Neveu-Lemaire M. 434 (B.R.)
 Brun G. 548 (Hel.)
 Brund G. (258) (Z.)
 Brunnekreeft, W. H. & Ongkidehong H. F. 965 (R.F.)
 Bruynoghe R. & Dubois A. 115 (R.F.)
 Buchanan G. S. 645 (Y.F.)
 Buchanan R. E. & Fulmer E. I. 82 (B.R.)
 Buchholz L. (902) (Dys.)
 Buchmann, M. 823 (Z.)
 de Buck, A. Schoute E. & Swellengrebel N. H. (824) (Z.) 915 (Mal.)
 Buckley J. J. C. with Butler 530 (Hel.)
 Buddie R. 242 (Z.)
 de Buen, S. 10 (37) 374 (Mal.) 653 (R.F.)
 — with Casas & Rodriguez 314 (K.A.) —

- Bulletin of the Astor Lenox Tilden Institute of America
268, 270 779 (Z.)
- Bulletin de la Société de Pathologie Exotique
170 (Y & S.)
- Bulletins from the Institute for Medical
Research, Federated Malay States 626
(Chl.)
- von Bülow T 852 (Y & S.)
- Bunau-Vanilla, P 308 (Y.F.)
- Bureau, Y with Jeannelus & Graudeau 614
(Lep.)
- Burke, A. M. B. 545 (Hel.)
- with Hoffman & Martin, 844 (Hel.)
- Burke, A. W. with Davis, 899 (Y.F.)
- Burke, G. R., with O'Connor 833 (Hel.)
- Burnet, E., 87 69 443 444 (Und.)
- & Conseil, E. 829 (Und.)
- & Durand, P. 844 (Fev.)
- — & Omer D. 460 bis (Fev.)
- & Omer D. 49 (Fev.)
- Burner with Jeannelus & Elmschiff, 858
(Y & S.)
- Burnier J. P. 808 (Opb.)
- Barrows, L., 323 (K.A.)
- Broschke A. & Joseph, A. 104 (Der.)
- Brow G. 323, 747 (K.A.)
- Brown, B., 216 (Rab.)
- Burka, H. E. 792 (Z.)
- Butler C. S., 177 (Y & S.) 289 (Hlst.)
- Butler G. 361 (Lab.)
- Burke J. B. & Buckley J. J. C. 830 (Hel.)
- Burt, L. W. with Gibbons, 779 (Z.)
- Buxton P. A. (258) (Z.) 436 (B.R.)
- C
- Cabanès, S. 346 (B.R.)
- Caffrey P. J. 493 (Dys.)
- Calado G. 154 (Dys.)
- with Joazeiro-Mihavetti, Combescuro &
Coimbra, 156 (Dys.)
- Calcutta, 435 (B.R.)
- Caldern, M. 726 (Rab.)
- Caldern Blasco S. (37) (Mal.)
- Callawaert Watan 806 (Der.)
- Calvo Criado V. 41 (Fev.)
- Casacho L. (569) (Dysc.)
- Cambesedès, H. & Cocher 64 (Und.)
- & Westphal, F. 1034 (Bl.)
- Cameron T. W. M. 833 (Hel.) 780 (Z.)
- Casamopotros, J. with Hinc, 156 (Dys.)
327 (K.A.) 453 833 836 839 840 (Fev.)
- with — Dumas & Saenz, 833 (Fev.)
- with — & Groux, 836 (Fev.)
- with — & Joazeiro, 781 (Dysc.)
- with — & Manosmakis, 42 (Fev.)
- Campbell, J. M. 907 (Mal.)
- Campbell, M. F. 181 (G.V.)
- Canal Fuydo E. J. with Raymond, 121 (R.F.)
- Canning, G. A., 549 (Hel.)
- Cannon, P. R. & McClelland, P. H. (5-4) (Z.)
- Capelan, G. with Le Boucher Laugret &
Tchernenko, 907 (Y.F.)
- Carbonell, M. V. (309) (Y.F.)
- Cardamath, J. P., 833 (Fev.)
- with Savas, 428 (B.R.)
- Carol, A., 238 (Z.)
- Carley P. S., 358 (Pel.)
- & Babbitt M. C., (818) (Mal.)
- Carmalt Jones, D. W., 878 (Hel.)
- Carnas J. A., 178 (Y & S.)
- Carpenter C. M. & Bosk, R., 58, 73 (Und.)
— with — 448 (Und.)
- Carpenter G. D. H., 187 (S.S.)
- Carracci, R. & Trapello 863 (Pel.)
- Carrero C., with Maria Macera, (93) (Hel.)
- Carri, M. A., with Fernández 608 (R.F.)
- Carrión, A. L. 264 (Z.)
- Carroll R. L., 23 (Mal.) 174 (Y & S.) 71 (Z.)
- Cartoso J. A. B. H., 120 (R.F.)
- Carter H. F., 741 (Z.)
- & Jacobs, W. P., 947 (Mal.)
- Carton, 947 (Mal.)
- Carton, A. 141 (Fev.)
- Carro R., 848 (Mal.)
- Casas, U., de Burn, S. & Rodriguez R. 314
(K.A.)
- Casazza, R., 1035 (Lep.)
- Castellon R., 41 (Fev.)
- Castellani, A., 102, 981 684 (Der.), 183 (Dys.)
755 761 769 (760) (Dysc.) 902 (Dys.)
- & Duval, C. W. 669 (Der.)
- & Mendelson, R. W., 806 (G.V.)
- Caster, M. R. & Greenway D. 322, (258) (Z.)
- — — — — Urdanis M. & Greenway D. F.
478 (Am.)
- Castiglioni O., (186) (Dys.)
- Castromova, G., (18) (Fev.)
- Catanel, A., 103 681 633 (Der.)
- with Foley & Girard, 363 (Mal.)
- with Montpellier & Caton 769 (Dysc.)
- with Sargent, Edm. & Et., Perrot &
Foley 362, 363 (Mal.)
- with — — — — — & Secret,
3 (Mal.)
- Cattor with Montpellier & Catanel, 769 (Dysc.)
- Cauhemex, L. 950 (Hel.)
- Cauveret, P. J. J., with Doguet & Escobar,
(80) (Chl.)
- Cavallini, E. & Cruciani, G., (387) (Mal.)
- Cawston, F. G. 632 bis 523 bis (Hel.) 857 bis
(Der.) 790 (Z.)
- Cazales T., 445 (Und.)
- Casanova, P., 643 646 965 (Y.F.)
- Casavac, E., 833 (Der.)
- Celn, A., 283 (Hlst.)
- Celi-Fraentel, A., 283 (Hlst.)
- Cerruti, C. F. 477 (Dys.)
- Chagas, C. 308, 1003 (Y.F.)
- Chagas, E., 299 (Y.F.)
- & de Freitas, L., 906 (Y.F.)
- Chaillot, L., with Normet & Urbani, 804
(Dys.)
- Chamberlain, W. P., 783 (B.R.)
- Chandler A. C., 901 (Hel.)
- with Chopra, 512 (B.R.)
- Chenotie, N. & Scordonsbeide, E., 836 (Fev.)
- Charles, J. A., 153 (Dys.)
- & Warren, S. H., 828 (Und.)
- Chataway J. H. H., 364 (Mal.)
- Chatterjee, K. R., with Ghosh & Chopra
569 (Dysc.)
- with Megaw & Ghosh, 23 (Mal.)
- Chatterji, K. R., 875 (Am.)
- Chatterji, S. P., with Henderson, 339 (Lep.)
- Chaudhuri, S. G., with Chopra, 318 (K.A.)
- Chester W. L., 530 (Hel.)
- Chesterman, C. C., 1022 (Bl.)
- Chi, C. C., with Tsien, 735 (Rab.)

- Chiabrera, G. & Reitano U 52 (Fev)
 Chiba, E. with Tanabe 474 (Am.)
 Chini, V. 727 (Rab)
 Chitre G. D., with Mackie 498 499 (Sp)
 Chodokin, N. I. & Schewitschenko F. I. 323 (h.A.)
 Chodokine N. J. & Soffieff M. S. 324 (h.A.)
 Chopra, R. N. & Chandler A. C. 512 (B.R.)
 — & Chaudhuri S. G. 318 (h.A.)
 — & Choudhury S. G. 746 (h.A.)
 — David, J. C. & Dikshit, B. B. 567 (Misc.)
 — Dikshit, B. B. & David, J. C. 424 (Misc.)
 — with Ghosh & Chatterjee 569 (Misc.)
 — & Dutt, A. T. 566 (Misc.)
 — Gupta J. C. & Choudhury S. G. 571 (Misc.)
 — & Ghosh, N. N. 566 (Misc.)
 — & Mullick, M. N. 171 (A & S)
 — & Pillai, K. V. 564 (Misc.)
 — & Rao, S. S. 884 (Hel.)
 Choudhury B. K. P. & Morison, J. 901 (Dys)
 Choudhury K. L. with Strickland & others 909 (Mal.)
 Choudhury S. G. with Chopra, 746 (h.A.)
 — with — & Gupta 571 (Misc.)
 Chow F. L., with Hindle 910 (Mal.)
 Chowdhury K. L. 253 (258) (Z)
 — with Strickland Dodda-Price Forsyth Smith, Murphy & Williams 4 (Mal.)
 Chowdhury S. P. R. with Bhattacharyya 372 (Mal.)
 Christophers S. R. Sinton J. A. & Covell G. 360 (Mal.)
 Christopherson, J. B. 884 (Hel.)
 Chuan, L. T. with Tsuchiya 634 (Pl.)
 Chukerbati J. C. 563 (Misc.)
 Clocimarra, G. (668) (R.F.)
 Cicerio R. W. 46 (Fev) 583 (Misc.)
 Coica, M. & Alexa I. 24 (Mal.)
 — Balif L. & Viéru M. 928 bis 944 (Mal.)
 Clark, H. C. 2 (Mal.) 271 bis (Z)
 Clark, O. (37) (Mal.)
 Clarke J. L. with Jackson van Hovenberg Filby & Green 37 (Mal.)
 Clarkson, L. M. 919 (Mal.)
 Claude 947 (Mal.)
 Clayton, F. H. A. & Warren S. H. 884 (Dys)
 Clearkin P. A. 139 (Fev)
 Clemente, G. 787 (Myc.)
 Cleveland, L. R. 233 bis 234 (Z)
 Cluzel, 34 (Mal.)
 Cocher with Cambesédès 64 (Und.)
 — with Mealey-Codre 330 (h.A.)
 Cochran R. G., 1036 1037 (Lep)
 — with Crozier 615 (Lep)
 — & Mittra, P. 340 (Lep)
 Cock, F. 559 (Misc.)
 Cohen A. J. 547 (Hel.) 861 (Y & S)
 Coles-Belcor J. 822 (Z)
 — with Nicolle & Anderson 118 638 668 (R.F.)
 — with Wolfman & Anderson 242 (Z.)
 Cobly S. with Herrnheld, Kibler Koenig, Schmid & Samodera, 675 (Fev)
 Cole, W. H. & Heideman, M. L. 874 (Am.)
 Coleman, M. B. with Gilbert 459 (Und.) 995 (Dys)
 Collart, A. with Schwetz & Geernick, 939 (Mal.)
 Collignon M. 1009 (Bl.)
 Colonieu L. with Raynard 328 (h.A.)
 Colwell C. with Davis 797 (Z)
 Comaroff R. with Klügler 715 (S.S.)
 Comblesco D. with Ionesco-Mihalesti Condrea & Calalb 156 (Dys.)
 Commonwealth Mass. 226 (Rab)
 Compton A. 639 (Pl.)
 Comyn h. (38) (Mal.)
 Condrea P. with Ionesco-Mihalesti Comblesco & Calalb 156 (Dys)
 Connal A. 390 (Lab.) 1015 (Bl.)
 Connor F. P. 450 (B.R.)
 Consell E. 842 bis (Fev)
 — with Burnet, 829 (Und.)
 Coogee C. P. 53 (Mal.)
 Cook A. R. 412 (Misc.) 859 (A & S)
 Cook C. 347 (B.R.)
 Cook D. H. with Tallaferrro & Hoffman 534 535 (Hel.)
 Cooke F. H. 334 (Lep)
 Cooke W. E. with Low & Martin 1023 (Bl.)
 — & Wilboughby H. 1021 (Bl.)
 Cool P. 122 (R.F.)
 Cooley R. A. 244 (Z)
 Coombs F. S. 587 (Misc.)
 Coonoor Southern India 735 (Rab.)
 Coope A. B. J. 424 (Misc.)
 Copanaris P. 40 (Fev) 450 (Fev)
 Corceff C. 238 (Z)
 Cordes W. 16 (Mal.) 171 (A & S.)
 Corkill B. (489) (Dys)
 — with Penfold 52 (Fev)
 Cormack R. P. 1014 (Eu)
 Corpus T. 626 (Chl.)
 Corradi, A. 938 (Mal.)
 Corson, J. F. 206 697 (S.S.)
 Cort E. C. 184 (Dys) 466 (Am.) 1017 (Bl.)
 Cort W. W. Otto G. F. & Spindler L. A. 985 (Hel.)
 Cortes N. A. F. 329 (h. A.) (385) (Mal.)
 Costa M. O. 502 (Sp)
 Costa Mandry O. 502 (Sp)
 — & Martin R. A. 466 (Am.)
 Cousin, G. 816 bis (Z)
 Coutelen F. 821 (Z) 886 (Am.) 878 (Hel.)
 Covell, G. 4 5 (Mal.)
 — with Christophers & Sinton 360 (Mal.)
 Coventry F. A. 549 (Hel.) 769 (Z)
 Covisa J. S. & Gonzalez Medina, R. 315 (K.A.)
 Cowdry E. V. & Cowell W. P. 239 (Z.)
 — & Scott G. H. 239 (Z.)
 Cowell, W. P. with Cowdry 239 (Z.)
 Craig C. F. 143 150 (Am.) 368 (Mal.)
 Craighead A. C. with Shortt Smith & Swaminath, 322 323 (h.A.)
 — with — & Swaminath, 310 (h.A.)
 Crawford, E. J. 174 (A & S)
 C.R. du Premier Congrès Antipesteux de l'U.R.S.S. Saratov du 31 mai au 3 juin 1927 92 (Pl.)
 Crozier G. G. 1033 (Lep)
 — & Cochran R. G. 615 (Lep)
 Crucilla, G. with Cavallini (387) (Mal.)
 Cruz J. da C. 888 bis (Dys.) 1003 bis (A F)
 da Cruz L. J. C. with de Mello 478 678 (Am.)

- Coutrecoess J & Garcia Tornel, L. (537)
 (Und.)
 Cusmod & N tal R. 505 (Oph.)
 da Cunha, A. M. & Minis J., 85 463 (Fev)
 295 303 308 646 (A.F) (258) (Z.) (902)
 (Dya.)
 Cunningham, J. 222 (Rab) 517 (B.R.)
 — Nicholas, M. J & Lahiri, B. N., 218 *uv*
 (Rab.)
 Curran, J. A. 230 (Z.)
 Curry D P. 821 (Z.)
 Curson, H. H. 261, 786 (Z.)
 Curtha, L. F., with Williams & Wildman
 869 (Am.)
 van Cutsem, A. 882 (Am.)
- D**
- Dagulm G. & Strazzi, T. (606) (R. F.)
 Daks W J L. 413 (Misc.)
 Dalal, K. R., 668 (Erb.)
 Dalrymple J. 110 (Der.)
 Damlow B. A., 813 (Z.)
 Dargem & Budeau 671 (R.F.)
 — & Oudard, 469 (Am.)
 Darre H. & Laffaille, A. 446 (Und.)
 Das, C. with Hodgson & Sen, 321 (h.A.)
 Datta, S. 548 (Hel.)
 Daskeas, S. H. 953 (B.R.)
 David, A. 757 (K.A.)
 David, H. 224 (Rab.)
 David, J. C. with Chopra & Dikshitt, 424 567
 (Misc.)
 Davies, W. M. 817 (Z.)
 Davila, J. V. with Phelps, 162 (Dya.)
 Davis, C. H. & Colwell, C. 797 (Z.)
 Davis G. E. with Hudson & Philp 1005
 (Y.F.)
 Davis, M. C. 252 (Z.) 1000 (Y.F.)
 — & Burke A. W. 999 (Y.F.)
 — & Rickard E. R. (949) (Mal.)
 — & Shannon R. C. 253 (Z.) 1000 (A.F.)
 Davis O. (802) (Dya.)
 Davis, W. D. (902) (Dya.)
 Davison A. R. 815 (Lep.)
 Dawley C. W. with Miller Jr. 540 (Hel.)
 De J. C. 47 (Fev.)
 De, N. K. with Henderson & Ghosh 617
 (Lep.)
 Dearman, W. A. 336 (Pel.)
 De Georges, L., 728 (Rab.)
 De la Guardia, J. 760 (Myr.)
 Delamare G. & Gatti, C. 106 663 bis 684
 (Der.) 667 (R.F.) 865 (G.V.)
 — & Guagni 866 (G.V.)
 Deland, C. M. 103 (Der.)
 Delanoë P. 823 (Z.)
 De la Torre, T. 22 (Mal.)
 De la Vega, J. F. 330 (K.A.)
 Delbanco E. Mählens, P. & Vogel, H., 981
 (Hel.)
 Del Favero E., (960) (Misc.)
 Delorme, M. & Anderson, T. E. 126 (R.F.)
 — with Troubler Deschamps & Limocoin
 556 (Hel.)
 Demina, N. A. & Nicolai W. W. 252 (Z.)
 Denney O. H. 603 (Lep.)
 — with Hopkins, 607 (Lep.)
 Denys, P., 882 M (Dya.)
- Deschamps, R. & Melnotte P., 465 (Am.)
 — with Troubler Limocoin & Delorme, 556
 (Hel.)
 Deutsch, B. (388) (Mal.)
 Devi, A. L. 782, 753 (K.A.)
 Dew H., 830 (Hel.)
 Dew H. R. 691 (B.R.)
 Dey N. C. 751 (h.A.)
 Dhar D. R. & Sen, K. C. 87 (Col.)
 Diaz, N. (757) (K.A.)
 Diaz Flores A. (949) (Mal.)
 Dak, J. H. with Van den Hoven van Gendera
 224 (Rab.)
 Dikshitt, B. H., with Chopra & David, 424 567
 (Misc.)
 — with Gupta, 752 (K.A.)
 Dimasenco-Nicolini, O., with Nicolas &
 Galloway 727 (Rab.)
 Dimitri, V., with Arce & Balado (337) (Hel.)
 Dimow D. A. & Nakhapetroff, M. L., 65 (Und.)
 Dinger J. E., Schöffner W. A. P. Seyden,
 E. P. & Swellengrebel, N. H., 1008 (Y.F.)
 Dionisio Gutierrez, P. & Hiron, J. 111 (Der.)
 Dircks-Dilly J. 967 (Hel.)
 Dixey M. B. D., 967 (Hel.)
 Djeparidze P. (949) (Mal.)
 Djeparidze P. S. 962 (Pel.)
 Dobell, C., 795 (Z.)
 — with Laddlaw & Bishop 469 (Am.)
 Dodds-Price J. with Strickland, Choudhury
 Forsyth, Smith, Murphy & Williams, 4
 (Mal.)
 Donatien, A. & Lestogard, F. 755 (K.A.)
 — & Parrot, L. 755 (h.A.)
 Donaldson, C. P., 593 (Misc.) 1022 (H.)
 Doorenbos W., 480 (Dya.)
 Doris, R., 447 (Und.)
 Doubrow, with Garin & Mounier 991 (Hel.)
 Doubrowine V. P., 651 (R.F.)
 Doucas, C., 751 (K.A.)
 Doughty, J. F., 273 (Z.)
 Dove W. E. with Kirby-Smith & Wahr,
 (903) (Hel.)
 Dowden, R. 390 (Mal.) 390 (Lab.)
 Dowling, O. 919 (Mal.)
 Draper A. P., 23 (Mal.)
 Drennon L. M. 147 (Am.)
 Drenowsky A. K., 370 (Mal.)
 van Driel, B. M. 53 (Fev.)
 Dechaparidze P., 828 (Mal.) 967 993 (Hel.)
 Dubois, A. 209 (S.S.)
 — with Bruyoghe 115 (R.F.)
 Dubreuilh, W. 102 (Der.)
 Duff W. R. with M'Hutchison, 18 (Mal.)
 Duffau & Lallemand 633 (Pl.)
 Dugdale J. N., 423 (Misc.)
 Duquet, M. L. F. Casseret, P. J. J. &
 Escalier J. A. R., (90) (Chl.)
 Duhag, J. V. & Jones, G. 278, 279 (Z.)
 Du Jardin-Beaumais, E., with Boquet, 639
 (Pl.)
 Duke H. L. 204 (S.S.)
 — Hall, G. N. & Haddon, E. C., 203 (Z.)
 Duke-Elder W. S. & Duke-Elder P. M. 808
 (Oph.)
 Dumas, J. with Hinc, Cambopetrou &
 Sams 838 (Fev.)
 Duman, J., 844 (Fev.)
 Duman, with Bobet & Pélit, 49 439 M (Fev.)
 Duncan, J. T., 441 (Und.)

Dunlop, G. A. 54 845 (Fev)
 Duprey A. B. 370 (Mal.)
 Dupuy H. 1028 (Bl.)
 Durnand, P., with Burnet, 844 (Fev)
 — with — & Ohmer 460 *bis* (Fev)
 Duren, (599) (Misc.)
 Duren, A. N. 813 (Z.)
 Dutt, A. T. with Chopra & Ghosh 566 (Misc.)
 Duval, C. W. with Castellani, 689 (Der)
 Duyter M. 565 (Misc.)
 Dyar H. G. 514 (B.R.)

E

Eato, S. N., with Sinton & Bird 379 (Mal.)
 Eber C. T., 507 (Oph.)
 Ebstein, E., 233 (Hist.)
 Eggleston, C. with Hunt McCann Rowntree
 & Voegtlin, 378 (Mal.)
 Egypt, 509 *bis* (Oph.)
 Ehara, I., 624 (Lep.)
 Ehemenger C., with Feldt, 423 (Misc.)
 Ekma, M., 534 (Hel.)
 El Bataah, M. H. 971 (Hel.)
 — with Khalil, Nazmi Peter & El Din
 972 (Hel.)
 El Din, M. S. with Khalil, Nazmi, Peter &
 El Bataah, 972 (Hel.)
 Eliaheff, with Jeanneime & Burnier 856
 (Y & S.)
 Eliot C. P., with Ford, 524 (Z.)
 Elkes, G., 894 (Dys.)
 Elkington, J. S. C. 583 (Misc.)
 Elmes B. G. T. with Smith 688 (Der)
 Elvery P. G. M., 583 (Misc.)
 Embil V. A. with Hoffmann, 791 (Z.)
 Emery F. E., with Herrick, 549 (Hel.)
 Endao A. 3 (Mal.)
 Enkova, E. M. A. & Brooks S. C., 484 (Dys.)
 Erstawi, K. (302) (Dys.) 948 (Mal.)
 Ernlova, E. & Kruchkova E. 579 (Misc.)
 Escalar G., with Pecori 34 (Mal.)
 Escalar J. A. E. with Duguet & Causeret
 (90) (Chl.)
 Escamel, E. 750 (K.A.)
 Escandero Franco F. with Arias Schreiber
 (824) (Z.)
 Esquivel, R. with Lenci, 220 (Rab.)
 Esnel, W. F. R., 253 (Z.) 912 (Mal.)
 Evans, W. H. 154 (Dys.)
 Ewing, H. R. 857 (B.R.)
 Eyl, M., with Richter & Manrer 540 (Hel.)
 Eyraud, R., with Bigot & Veln, 736 (Rab.)
 Eyre, J. Notton H. E. F. & Pope W. J. 567
 (Misc.)

F

Fardo A. A., 497 (Sp.)
 Fairley K. D., 977 (Hel.)
 Fairley N. H. 770 *bis* 775 (Z.)
 — with Mackie 500 (Sp.)
 — & Billmoris H. S. 491 (Sp.)
 — & Splatt, B., 773 (Z.)
 — & Wright Smith, R. J. 979 (Hel.)
 Fanell, G., 476 (Am.)
 Far Eastern Association of Tropical Medicine
 517 (B.R.)
 Faust, E. C. 539 970 978 (Hel.) 786 *bis* (Z.)

Faust E. C. & Kellogg C. R. 786 (Z.)
 — with Lj 539 (Hel.)
 — with Zia, 29 (Mal.)
 Favilli G. (74) (Und.)
 — & Boncinelli U. 72 (Und.)
 Favre with Nicolas & Lebeuf 862 (C.Bu.)
 Fawcett, J. & Gibson A. G. 768 (Myc.)
 Federated Malay States 36 360 (Mal.) 399
 (Lab.)
 Feemster R. F. & Feemster O. S. 563 (Misc.)
 Feldt A. & Eisenmenger C. 423 (Misc.)
 Feldt, A. M. 528 (Hel.)
 Ferguson E. W. 40 (Fev)
 Fermi C. (38) 369 (Mal.) 245 (Z.) 730 *bis*
 731 *quat* 733 734 (Rab.)
 — & Lumbau D. 729 (Rab.)
 Fernandez, E. C. with Loganadan 896 (Dys.)
 Fernandez J. G. & Carri M. A. (668) (R.F.)
 Fernando S. E. with Spittel 690 (Der)
 Fernós Iern, A. 588 (Misc.)
 Ferrari A. (388) (Mal.) 560 (Misc.) 996 (Y.F.)
 Ferreira I. C. (1044) (Lep.)
 Ferrer H. 506 (Oph.)
 Ferrero M. (1044) (Lep.)
 Ferruccio C. R. (335) (Bb) 858 (Y & S)
 Fettwels M. 899 (Dys.)
 Fialho A. 636 (Pl.) 693 (Y.F.)
 — Bicalho N. & Pacheco G. 300 (Y.F.)
 — with Jakob Villela A. & E. L. 298 (Y.F.)
 — with de Mello 123 (R.F.)
 Fichera S., 895 (Dys.)
 Fiera, E. R. 851 (Y & S)
 Fiertz C. O. with Kopeloff 30 336 (Mal.)
 Fiesinger N. & Walter H. 1023 (Bl.)
 File C. A. with de Rivas 527 (Hel.) 787 (Z.)
 de Figueiredo B. with Penna (1008) (Y.F.)
 Figueiredo N. 1043 (Lep.)
 Figueroa C. A. & Bilbao L. 7 (Mal.)
 Filby E. L., 919 (Mal.)
 — with Jackson van Hovenberg Green &
 Clarke 37 (Mal.)
 Finik, Z. & Migle S. 736 (Rab.)
 Finney W. P. 273 (Z.)
 Finocchio M. with Volpino 221 (Rab.)
 Fischer O. 18 945 (Mal.) 577 (Misc.) 878
 (Am.)
 — & Rheindorf G. 376 (Mal.)
 Fischer W. 529 (Hel.)
 Fischl F. 863 (C.Bu.)
 Fischl V. with Steiner 653 (R.F.)
 Flaudin, C. Marchal G. & Langlois L.
 (949) (Mal.)
 Fletcher W. Lesslar J. E. & Lewthwaite
 R., 52 848 (Fev)
 Flora, G. with Portocalis 453 (Fev)
 Flu P. C. 638 *bis* (Pl.)
 Foley H. Catanei A. & Giraud A. 363 (Mal.)
 — with Sergeant Edm. & Et. Parrot &
 Catanei 362 363 (Mal.)
 — with — — & Senevet 3
 (Mal.)
 Fonquernie J. 99 (Pl.)
 da Fonseca, O. (309) (Y.F.) 679 (Der)
 — & Leao A. E. de A. 766 (Myc.)
 Forbes (949) (Mal.)
 Ford W. W. & Elliot C. P. 524 (Z.)
 Forbes-Brown, 878 (Am.)
 Forsyth C. E. P. with Strickland Chowd
 bury Dodds-Price Smith Murphy &
 Williams 4 (Mal.)

- Fort, M. A., 551 (Hel)
 Foud, A. M. M., 971 (Hel)
 Fourche J. A., 191 (S.S.)
 — & Rocklin, J., 183 (S.S.)
 Fox, H., 103 (Der)
 Fraga, C., 294 & 309 (Y.F.)
 Franchini, G., 240 244 bis, 248 298 800 (Z.)
 (489) (Dya.) 34., 614 625 (Lep.)
 — & Bacchelli, G., 983 (Hel)
 Franke, E., with Arca & Ralado, (557) (Hel)
 Frankel, E., 485 (Dya.)
 Franklin, E. M., 85* (A & S.)
 Fraser V., with Pettit & Stefanopoulos, 307
 (A.F.)
 Fran, A., with Maras, 1042 (Lep.)
 Frei, W. & Koppel, A., 881 (A & S.)
 Freiman, M., 930 (Mal)
 de Freitas L., with Chapas, 896 (Y.F.)
 Freudenthal, P., (558) (Hel)
 Fried, S. M. & Segal, M. B., 679 (Der)
 Friedberg, E. A. H., 621 (Lep.)
 Frobbler Jr. M., 1004 (Y.F.)
 Fröes, H., (368 ter) (Mal)
 Fruguele, T., with Tegoni & Williams, (35)
 (Mal)
 Fuchs, D., 783 (K.A.)
 Fujimori, K., 629 630 (Chl)
 Fujimura, A., 825 (Hel)
 Fujisaki, K., with Matsumura et al., 965 (Bb.)
 Fujisaki, T., 847 (Hel)
 Fujiwara, A., 623 (Lep.)
 Fukushima, B., 123 bis (R.F.)
 Fullerton, F., 513 (B.R.)
 Fullerton, H. R., 919 (Mal)
 Fulmer E. I., with Buchanan, 82 (B.R.)
 Furukawa H., 712 (S.S.)
 Fusco, G., (642) (Pl.)
- G
- Gabbi, U., (842) (Fev)
 Gabriellide, D., 504 (Oph)
 Gage I. M., 808 (G.V.)
 Galan M. A., (1044) (Lep)
 Galloway W. R. & Weiss, C., 769 (Mrc.)
 Gallas G., 12 (Mal)
 Gallard, H., 126 (R.F.) 723 (S.S.)
 Galb-aleno 986 (Hel)
 Galloway D., 759 (Myc)
 Galloway I. A., with Nicolai & Dimasiosco-
 Nicolai, 27 (Rab)
 Galt, C. M., 416 (Misc)
 da Gama, L. A., 562 (Misc)
 Gambler A., (101) (Pl.)
 Gammara A., 277 (Z.)
 Ganguly L. B., 627 (Chl)
 Garcia, O., 80 (Chl)
 Garcia Tonnell, L., with Cuatrecasas, J.,
 (832) (Und)
 Gardner G., 131 (R.F.)
 Gardner L. L., with St. John & Simmons, 988
 (Hel)
 Garm, C., Dombrow & Mowser 991 (Hel)
 Garofali, F., (949) (Mal)
 Gartow, W. M., 35 (Mal)
 Gasser R. R., 180 (A & S)
 Gastambina, U., 370 (Mal)
 Gaté J. & Michel, P., 862 (C.Bn.)
 Gater B. A. R., 805 (Z.)
- Gatti, C., with Delamare 106 803 bis, 804
 (Der.) 887 (R.F.) 863 (G.V.)
 Gavilla Alvarado, E. R., with Semharis,
 (1044) (Lep.)
 Gavilla, L., 963 (Pel)
 Geernick, with Schwartz & Collart, 838 (Mal)
 Geiger, A., with Klügler 718 (S.S.)
 Geiger J. C., with Williamson & Harper, 679
 (Am.)
 Geloncel, G., 128 (R.F.) (489) (Dya.), 678
 (Fev)
 Genesckundig Tijdschrift voor Nederlindsch-
 Indie 402, 403 (Lab)
 General Government of French West Africa,
 802 (B.R.)
 Genosse G., 1025 (Bt)
 — & Zallocco, A., 870 (Mal)
 Genovese, F., (949) (Mal)
 Geoghegan, A. J., 203 704 (S.S.)
 Georgopoulos, M., 453 (Fev)
 Gerlach, F. & Schweinburg, F., 726 (Rab)
 Gesner P. E., 634 (Pl.)
 Gesner O., 677 (Am)
 Ghabb, A., with Hauduroy 638 (Pl.)
 Gheracovici, L., with Balit, 336 (Pel)
 Gbetti, G., (608) (R.F.)
 Ghose G., 462 (Fev.)
 Ghosh, G., 354 (Bb.)
 Ghosh, N., 743 (K.A.)
 Ghosh, N. N., with Chopra & Gupta, 508
 (Misc.)
 Ghosh, S., 509 (800) (Misc)
 — Chopra, R. N. & Chatterjee N. R., 808
 (Misc.)
 — with — & Dett, 806 (Misc)
 — with Henderson & De 617 (Lep)
 — with Megaw & Chatterjee 23 (Mal)
 Ghosh, U., 967 (Bb.)
 Giagui, with Delamare 886 (G.V.)
 Giamli, G., 948 (Mal)
 Gibbs, D. F., 777 (Z.)
 Gibbs, O. S., 469 (Misc)
 Gibson, A. G., with Fawcett, 68 (Myc)
 Gijikoh, G., 864 (G.V.)
 Gilbert, R. & Coleman, M. B., 438 (Und)
 805 (Dya.)
 Gildemeister, E. & Karmann, P., 218 (Rab)
 Gill, D. G., Baker C. C. & Sosa, L. C., 919
 (Mal)
 Gill, J. M., with Kertis, 479 (Dys)
 Gillet, H., 408 (Misc)
 Gilmer W. P., with Wilson, 1041 (Lep)
 Gilroy J. C., 148 (Am)
 Gilmlette J. D., 168 (B.R.)
 Ginda, with Pittalega, Marthow Cops &
 Torrion, 917 (Mal)
 Gionetti, G., 969 (Hel)
 Giordano, A. S., with Sosenich, 60 (Und)
 Giordano, M., 257 (Z.) 606 (R.F.), 664 (Der.)
 1040 (Lep)
 Girard, G., 638 (Pl.)
 — & Robie, J., 861 (Y & S)
 Girard, A., with Foley & Catanel, 383 (Mal)
 Girard, P. & Misset, M., 316 (K.A.)
 Girardoux, R., with Jeannine & Bernas,
 614 (Lep)
 Giroed, P., with Blanc & Caminopetros,
 839 (Fev.)
 Gibbons, T. S. & Betz, L. W., 779 (Z.)
 Giegal, F. & Savorini, G., 57 (Und)

- Gladin, S. 265 (Z.)
 Gloster T H. 735 (Rab.)
 Glover, W E. 268 (Z.)
 Guedina, M. P. & Statirova, N. A. (558) (Hel.)
 Goffin, R., 571 (Misc.)
 Goldberger J. 981 (Pel.)
 — Wheeler G. A. Sydenstricker E. Kling W. I. & others, 356 983 (Pel.)
 Gold Coast, Ann. Rep. Med. Res. Inst. 389 (Lab.)
 — Rep. on Med. & San. Dept. 646 (I.F.)
 Goldie, H. 840 (Fev.) 971 (Hel.)
 Gollini, A., (900) (Misc.)
 Gomes, J. M. & Junior J. D. de P. 341 (Lep.)
 — & do Pateo Jr., J. D. 617 (Lep.)
 — & Pessoa, S. B., 685 (Der.)
 — with Silveira 1041 bis (Lep.)
 Gontcharow G. D., 815 (Z.)
 Gonzalez Arcuno, F. with Alonso Alonso (949) (Mal.)
 Gonzalez Medina R. with Covisa, 315 (K.A.)
 Gord, S. N., with Mackie, 501 (Sp.)
 — with — & Wadia, 497 (Sp.)
 God, P. with Manieri 663 (R.F.)
 Gordo, R., 1029 (Bl.)
 Goyik A. N., 98 (Pl.)
 Grady A. G., 257 (Z.)
 Gni, 703 (S.S.)
 Graham, J. D., 83 bis 89 90 (Chl.) 329 (K.A.) (642) (Pl.)
 Grant, H. G. 919 (Mal.)
 Grasmuck, E., 891 (Dys.)
 Gray G. M., 1015 (Bl.)
 Gray J. D. A. 116 (R.F.)
 Greco N. V., 343 (Lep.)
 Greeley H. P., with Stovall, 781 (Myc.)
 Green, F. W. with Jackson, van Hovenberg, Filby & Clarke 37 (Mal.)
 Green, R., 333 614 (Lep.) 380 931 bis (949) (Mal.), 759 (Myc.)
 Greenway D., 152 (Am.) 232 (Z.)
 — with Carter, 232, (258) (Z.)
 — with — Greenway D. F. & Urdaniz 478 (Am.)
 Gregg, A. L., 606 (B.R.)
 Grew A. D., (642) (Pl.)
 Grepp, L., 895 (Dys.)
 Grey C. G. 1025 (Bl.)
 Grilnow V. M. 45 (Fev.)
 Griffiths, T. H. D. 919 (Mal.)
 Gromaschewskij L. W. & Schrochat, J. A. 238 (Z.)
 Gross, M., 566 (Misc.)
 Grogger E. W. & Breder Jr., C. M., 791 (Z.)
 Gueimino D., 917 (Mal.)
 Gueinold A., with Tournier 455 (Fev.)
 Guernant, N. B. with Salmon & Hays 359 (Pel.)
 Gudia Morales, E., (38) (Mal.)
 Guisarte, A. (38) (Mal.)
 Goldberg, G. 183 (G.V.)
 Gupta, A., 677 (Der.)
 Gupta, A. K. D., with Knowles, Gupta, B. M. D. & Gupta, U. 148 (Am.)
 Gupta, B. M. D. & Dikshit, B. B., 752 (K.A.)
 — with Knowles 139 (Fev.) 783 (Z.)
 — with — Gupta, A. K. D. & Gupta, U., 148 (Am.)
 Gupta J. C. with Chopra & Choudhury 571 (Misc.)
 — with — & Ghosh 566 (Misc.)
 — with — & Mullick, 171 (Y & S)
 — with — & Pillai 564 (Misc.)
 Gupta, U. with Knowles Gupta, A. K. D., & Gupta B. M. D. 148 (Am.)
 Gushue-Taylor G. 608 (Lep.)
 Gutiérrez Lara, J. 211 (S.S.) (558) (Hel.)
 Gutzewitsch A. W. with Magnitsky 816 (Z.)
 Gwéclansany J. with Alexeeff 797 (Z.)
- ## H
- Habermann R. & Serefs S. (388) (Mal.)
 Habs H. 61 (Und.)
 Hackett L. W. 919 (Mal.)
 — with Masirolli, (824) (Z.)
 Haddon E. C. with Duke & Hall 262 (Z.)
 Hadenfeldt, A., with Seelmann, 443 (Und.)
 Hadjigeorgis A. with Papadopoulos & Joel 835 (Fev.)
 Hahn M. & Hirsch J. 628 (Chl.)
 Hakki I. 527 (Hel.)
 Hall G. N. with Duke & Haddon 262 (Z.)
 Hall R. N. 174 (Y & S)
 Hamilton, R. G. 919 (Mal.)
 Hamilton Browne E. 752 (K.A.)
 Hamlyn Harris R. 808 809 (Z.)
 Hanafin J. B. 581 (Misc.)
 Hance J. B. 368 (Mal.)
 — & Perahad J., 580 (Misc.)
 Hanschell, H. M. 703 (S.S.) 865 (G.V.)
 Hanson H. 11 (Mal.) 994 (Y.F.)
 Hara Y. 778 (Z.)
 Harada N. with Mikawa & Nomura (950) (Mal.)
 Hararoff T. G. (38) (Mal.)
 Hardy A. V. 439 827 (Und.)
 Harley Mason R. J. 593 (Misc.)
 Harris Jr. H. E. 973 (Hel.)
 Harris N. G. 586 (Mal.)
 Harrison, W. T. with Jackson 273 (Z.)
 Hartoch O. & Rothermundt M. 662 (R.F.)
 Harvey F. M. with Newham, 561 (Misc.)
 Haschnow G. with Tanew 933 (Mal.)
 Hase, A. 277 822 (Z.)
 Hasegawa, K. 681 (Hel.)
 Haslo G. 623 (Lep.)
 Hassall A. with Stiles 241 (Z.)
 Hasselmann C. M. & Hasselmann Kahlert M. 371 (Mal.)
 Hasselmann Kahlert, M. with Hasselmann 371 (Mal.)
 Handuroy P. & Ghalib A. 638 (Pl.)
 Hauser G. H., 223 (Rab.)
 Hay W. D. 226 (Rab.)
 Hayaah F. 341 (Lep.)
 Hays I. M. with Salmon & Guernant 359 (Pel.)
 Heagerty J. J. 345 (B.R.)
 Heatly Spencer J., 47 (Fev.)
 Hecht, O. 247 (Z.)
 Hecht Eleda M. 364 (Mal.)
 Hegh, E., 601 (B.R.)
 Hegler C., 494 (Sp.)
 Hegner R. 229 802 (Z.)
 — Shaw Jr. E. H. & Maxwell R. D., 24 (Mal.)

- Heldeman, M. L., with Cole 874 (Am.)
 Hein, G. E. & Merrill, J., 900 (Pel.)
 Heinemann, H., 854 (Y & S.)
 Hehn, R., 717 (S.S.)
 Helmy, M. M. 971 (Hel.)
 — with Augustine, Nazmi & McGavran 553 (Hel.)
 Hemphill, R., 635 (Pl.)
 Henderson, J. M., 1036 (Lep.)
 — & Chatterji S. P., 336 (Lep.)
 — De N. K. & Ghosh, S. 617 (Lep.)
 — with Mohr 1036 (Lep.)
 — with Napier 1036 (Lep.)
 Hennessey, P. H., 510 (Oph.)
 Henry, A. F. 333 *for* 840 *for* (Mal.)
 Henry E., with van den Branden, (951) (Mal.)
 d'Hérède F., 86 (Chl.)
 Héritvaux, 190 (S.S.)
 Hermann, E. H., 508 (Misc.) 857 (Y & S.)
 Hermann, E., with de Langen 1031 (Lep.)
 Herms, W. B., 243 (Z.)
 Herrick, C. A. & Emery F. E., 549 (Hel.)
 Herrmann, G. & Hlenskowski H., 396 (Mal.)
 Herrmann, O., 225 *his* 727 (Rab.)
 — & Malhoma, A., 9 (Mal.)
 Herzhfeld, A. S., Kibler O. A., Colby S., Koenig, M. T., Schmid, O. W. & Saunders, A. M., 675 (Fev.)
 Hertig, M. with Young, 741 (h.A.)
 Hetzenberg, L., 723 (Rab.)
 Hesse, E., 734 (Rab.)
 Hewetson, W. M. 1018 (Hel.)
 Heydon, G. M., 854 869 (Hel.)
 Hicks, E. P. 264 (Z.)
 Hildebrand, P. 281 (Hist.)
 Hill, L. R., with Jaffé, 766 (Myc.)
 Hill, R. B., 9th (Mal.)
 — & Benarroch, E. 371 (Mal.)
 Hill, R. C., 660 (Der.)
 Hille-Yofé, 1017 (H.)
 Hilleret, (903) (Dys.)
 Hillman, J. A. (Wabruen, H. F. & Zimmerman, H. M. 184 (C. Bu.)
 Hindle E. 29th (Y. F.) 311 (K.A.)
 — assisted by Chow F. L., 910 (Mal.)
 Hinman, E. H. with Matheson, 813 (Z.)
 Hirazawa I. 631 (Hel.)
 Hirsch, J. 628 (Chl.)
 — with Hahn, 628 (Chl.)
 Hirst, A. S. 822 (Z.)
 Hlenskowski, H. with Herrmann, 396 (Mal.)
 Hoare C. A. 21. (S. S.)
 Hockett, A. J. 629 (Mal.)
 Hodges, R. H. 466 (Am.)
 Hodgson, E. C. & Sen, R. T. 322 (K.A.)
 — & Das, C. 321 (K.A.)
 Hoeltzer R. R., with Aristowsky 860 (R.F.)
 Hopf, R. 1019 (H.)
 Hoffmann, F. L. 919 (Mal.)
 Hoffman, W. A. Marla, R. A. & Burke A. M. B. 644 (Hel.)
 — with Taliaferro & Cook, 534 635 (Hel.)
 Hoffman, W. H. 842 (Hel.)
 Hoffmann, C. C. 700 (S.S.)
 Hoffmann, W. H., 104 (Der.) (309) *his* (Y. F.) 619 (Lep.) 764 (Myc.) 952 (B.R.) 963, 1006 (Y.F.)
 — & Embel, V. A. 791 (Z.)
 — & Jammel, F., 306 (Y.F.)
 Hoffmann, W. H. & Ramon Burr, P., (1044) (Lep.)
 Hofim, J. W., 36 (Mal.)
 Hogue M. J. 235 (Z.)
 Hobenadal, B., with Kucynski, 296 (Y.F.)
 Holmes M. J., 37 (Mal.)
 Houdg, P. J. J. & Swellengrebel, N. H. 22 (Hist.)
 Hopf G., 10 (Mal.)
 Hopkins, R., 1036 (Lep.)
 — & Denney O. E., 607 (Lep.)
 Horn, L., 643 (Mal.)
 Hornby H. E., 711 (S.S.)
 Hornum, P. 653 (R.F.)
 — with Nicolle & Anderson, 657 (R.F.)
 Horovitz A. & Sautet, J., 636 (Mal.)
 Horowitz with Jeannelme, (344) (Lep.) 606 (Misc.)
 Hosh, N., 478 (Dys.)
 Hoshiraki, S., 162 (Dys.)
 Hosoya, S., with Stéfanopoulos, 129 (R.F.) 483 *his* (Dys.)
 Hotta, T., 221 (Rab.)
 Hotta, Y., 30 (Mal.)
 Hôte F. A., 415 (Misc.)
 van Hovenberg, H. W., with Jackson, F.R. Green & Cla. 37 (Mal.)
 Howard, H. H., 552 (Hel.)
 Howden, A. L., 477 (Dys.)
 Howell, A. T., (900) (Misc.)
 Hu C. H. Huk D. & Lee, C. U., 742 (K.A.)
 — & Lee C. U., 742 (K.A.)
 — Reimann, H. A. & Krottkikh, T. G., 785 (Myc.)
 Huddleston, I. F. & Abell, E., 73 (Cod.)
 Hudson, E. H., 177 (Y & S.)
 Hudson, N. P., with Baser 303 (Y.F.)
 — Baser J. H. & Philip, C. B., 647 (Y.F.)
 — Philip, C. B. & Davis, G. E., 1005 (Y.F.)
 Huertas, F., (239) (Pel.)
 Huet, L., with Jeannelme & Lotte, 106 (Der.)
 Huk D., with Hu & Lee 742 (K.A.)
 Hukink, A. S. B. with Schuurman, 91. (Mal.)
 Huisman, R. G. J. P., 814 (Z.)
 Huizenga, I. S. 1034 (Lep.)
 Hulsehoff A. A., 373 (Mal.)
 — with Olivier 20 (Mal.)
 Hunt, R., McCann, W. S., Rowntree L. G. Voegtlin, C. & Eggleston, C., 378 (Mal.)

- Iagnor S., 595 (Misc.)
 Ichok, G. 457 (Fev.)
 von Ihering R. (255) (Z.)
 Ito J., (486) (Dys.)
 Imahashi, T., 79th (Z.)
 Imal, B. 635 (Hel.)
 — with Miya, 635 (Hel.)
 Indian Medical Gazette, 106 (Der.) 313 (K.A.)
 Infurna, G. 581 (Misc.)
 Ingram, A. & de Mailion, B., 606 (Z.)
 Inniss, K. U. A., 276 (Z.)
 Ionesco-Mihaliet, C. Conabesco, D., Conabesco, P. & Calab, G., 156 (Dys.)
 Iriarte D. R., 227 257 (Z.)
 — & Salas, L. M. 864 (G.)
 Irvine G. M., (949) (Mal.)
 Isaacs, R., Sturgis, C. C. & Smith, M. 446 (Hel.)

K

- Ishida, L. 235 (Z.)
 Ishizu, Y., 157 (Fev)
 Ismail, A., (800) (Misc.)
 Ito, K., with Matsumura et al. 965 (Bb.)
 Iwasawa, D. A. 116 (R.F.)
 Iyengar M. O. T., 3 (Mal.) 244 250 263 815 (Z.)
 — & Sur P. 3 (Mal.)
 Izar G., 64 (Und.)
 Izquierdo Salazar A. (165) (Dys.)
- Jack, R. W. 260 (Z.)
 Jackson, D. & Harrison, W. T. 273 (Z.)
 Jackson, L. E., van Hovenberg H. W., Filby E. L. Green, F. W. & Clarke J. L. 37 (Mal.)
 Jacobson, H. P., 765 (Myc.)
 Jacoby C., 901 (Dys.)
 Jacobs, W. P., 552 bis (Hel.)
 — with Carter 947 (Mal.)
 Jaffe, R. H. & Hill, L. R. 768 (Myc.)
 Jagoboff F. 973 (Hel.)
 Jahnel F., with Hoffmann 308 (Y.F.)
 — & Lange J., 175 (Y. & S.)
 Jakimow W. P., 125 661 (R.F.)
 Jakob, Flialho A. Villela, A. & E. L. 298 (Y.F.)
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 Japan Medical World, (642) (Pl.)
 Jansko, H., 126 (R.F.)
 Jans L., 11 (Mal.)
 — & van Nitsen, R. 11 (Mal.)
 Jeanneime Bernier & Eliascheff 856 (Y. & S.)
 — & Horowitz, (344) (Lep.) (800) (Misc.)
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 Jeanneime, E. 824 (Lep.)
 — Giraudou R. & Bureau Y. 614 (Lep.)
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 Jensen, J. P., (74) (Und.)
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 Jensen, V., (949) (Mal.)
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 Joannidis, G. S. 837 (Fev)
 Joannes M. I., with Radzima, 578 (Misc.)
 Johns, F. M. 680 (Der.)
 Johnson, H. A., with LePrince 919 (Mal.)
 Johnson, T. L., 719 720 (S.S.)
 Johnson, W. B. & Lester H. M. O. 701 (S.S.)
 — & Lloyd, L. 259 (Z.)
 Johnson, J. W. S. 235 (Hist.)
 Jones G. with Duhig, 278 279 (Z.)
 Jonesco, D. & Teodoros V., 728 (Rab.)
 — & Valter V., 729 (Rab.)
 Jordan, D. S. (258) (Z.)
 Jorge R. 95 (Pl.)
 Joseph, A., with Buschko 104 (Der.)
 Jourdan, E. & Le Meilleur 964 (Bb.)
 Journal of Oriental Medicine (642) (Pl.)
 Joyeux, C. & Baer J. G., 975 976 (Hel.)
 Jungmann, P. 300 (Y.F.)
 Junior J. D. de P., with Gomes 341 (Lep.)
 Justesen, P. T., 797 (Z.)
- Kabelik, J., 337 (Mal.)
 Kadaner M., 37 (Mal.) 174 (Y. & S.) 648 (Y.F.)
 Kaganova S. S. with Kritschewski 711 (S.S.)
 Kakinuma, G. with Matsumura et al. 965 (Bb.)
 Kalmukoff E. S. (949) (Mal.)
 Kalthofen, A. 863 (G.V.)
 Kamal H. 39 (Fev)
 Kamath, A. V. 355 (Bb.)
 Kampmeier R. H. 57 (Und.)
 Kanagarayer K. 550 (Hel.)
 Kanao R., with Matsumura et al. 965 (Bb.)
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 — Okropiridae B. & Abuladse S., (949) (Mal.)
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 Kangragat, S. 275 (Z.)
 Kaplan, B. with Williamson & Geiger 870 (Am.)
 Karamchandani P. V., 19 (Mal.)
 Karger P. 975 (Hel.)
 Kariboff, N. (993) (Hel.)
 Karibow N., 818 (Z.) 973 (Hel.)
 Karmann, P. 737 (Rab.)
 — with Gildemeister 219 (Rab.)
 Karve D. S. 924 (Mal.)
 Kasauli Pasteur Institute of India 223 735 (Rab.)
 Kathe 132, 672 (R.F.)
 Kauders, O. 30 (Mal.)
 Kauntze W. H. 393 (Lab.)
 Kavanaugh, C. N. 826 (Und.)
 Kawashima K. with Matsumura et al. 965 (Bb.)
 Keigeluchis I. 747 (h.A.)
 Keil, E. & Unna Jr. P. 620 (Lep.)
 Keining E. & Serefs S. 335 (Mal.)
 Kellaway C. H. 774 ter 780 (Z.) 978 (Hel.)
 Kellogg C. R. with Faust 786 (Z.)
 Kenya 395 (Lab.)
 Kern, R. A. 69 (Und.)
 Kerr I. 1039 (Lep.)
 Kerrin J. C. 153 (Dys.)
 — & Gill J. M. 479 (Dys.)
 Kessel, J. F. 151 (Am.) 229 230 235 (Z.)
 Keyworth, W. D. 367 (Mal.)
 Khalid, Z. 161 (Dys.)
 Khalil, M. Nazmi, M. Peter F. M. El Din, M. S. & El Betash, M. H. 972 (Hel.)
 Khodunkin, N. I. 324 (K.A.)
 Khoori, J., 486 (Dys.) 871 881 (Am.)
 Kibler O. A. with Herahfield, Colby Koenig Schmid & Saunders, 675 (Fev)
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 King, H. H. & others, 809 (Mal.)
 King, W. I. with Goldberger Wheeler Sydenstricker & others 358 963 (Fel.)
 Kingsley Ward, S. 909 (Mal.)
 Kipchidse, N. 488 (Dys.)
 Kirby Smith, J. L. 1038 (Lep.)
 — Dove W. E. & White G. F. (993) (Hel.)

- Kirilova-Oodintsova, A. W., (558) (Hel)
 Kirk, J. B. 543 (Hel)
 Kirkpatrick, H., 504 (Oph.)
 Kirwan, E. W. O.G. 370 (Mal.) 506 (Oph.)
 Kitchen S. F., with Sawyer & Lloyd, 1007 (Y.F.)
 Kitchevatz M. 892 (C.Bu.)
 Klauder J. V. 679 (Der)
 Kligler I. J., 6 (Mal.) 44 (Fev)
 — & Ashner M. 44 (Fev)
 — & Comaroff, R. 715 (S.S.)
 — & Gelger A. 718 (S.S.)
 — & Liebman, E., 364 (Mal)
 — & Reitter B. 364, 922 (Mal)
 Kling, C. 823 (Und.)
 Klopstock, A. with Sachs, 541 (Hel)
 Kluemp T. G., with Richardson, 495 (Sp.)
 Kniakovsky B. 608 (Lep)
 Knowles, R. with Acton 77 (B.R.)
 — & Gupta, B. M. D. 130 (Fev), 798 (Z)
 — — — Gupta, A. H. D. & Gupta, U., 148 (Am)
 Kobayashi, H., 526 (Hel)
 Kobayashi, T., 555 (Hel)
 Koening, M. T. with Herahfield, Kibler Colby Schmid & Saunders, 678 (Fev)
 Koera, C. H. with Martens, 235 (Z)
 Koldi, C. A., 703 (Z)
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 Kolmakow A. S. (38) (Mal)
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 — with — & King, 621 (Mal)
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 Koenig, W. J. 387 (Mal)
 Koenigs Wilhelmina Jublaeren Stichting, 415 (Alac.)
 Kopeloff, N. & Fieritz, C. O. 30 396 (Mal)
 Kopka, A. 189 (S.S.)
 Koppel, A. with Frei, 861 (A & S)
 Kopstein, F. 777 bis (Z)
 Korke, V. T. 544 (Hel)
 Kortenhaus, F. 280 (Hiet)
 Kosarew N. with Lurjo & Rosenblatt 891 (Dys)
 Kousagume S. M. 973 (Hel)
 Kraus, R. 44 (Fev) 778 (Z)
 Krauss, W. 16 919 (Mal)
 Krieg, F. 602 (Dys)
 Krikorian, K. S. with Stuart, 223 732 (Rab)
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 — & Kaganova, S. 8 711 (S.S.)
 — & Schapiro, S., 420 (Musc.)
 — & Schwarzmann, L. 420 (Musc.)
 Kritschewsky N. L., 727 (Rab)
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 Krupa, M., 385 (Mal)
 Kruug, Y. T., 84 (Chi)
 Kucyaski, M. H. with Hohenadel B. 286 (Y.F.)
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 — & Ruyss, A. C. 674 (Fev)
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 Kammell, H., 577 (Musc.)
 Kurdiani S., (860) (Mal)
 Kurotchkin, T. G. with Ha & Reimann, 765 (Myc.)
 — with Reimann & Tso, 765 (Myc.)
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- Labernadie, V. (950) (Mal)
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 — & Laffitte, N. 748 (K.A.)
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 Lackey J. B. with Rodolfs, 808 (Z)
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 La Face I. & Raffaele G., 254 (Z)
 Laffaille A., with Darré 448 (Und)
 Laffitte, N. with Labernadie 748 (K.A.)
 Lahiri, B. N. with Nicholas & Cunningham, 219 ter (Rab.)
 Lai, D. G. & Lal, S. W., 341 (Lep)
 Landlaw P. P., Dobell, C. & Bishop, A. 498 (Am)
 Laigret, J. 463 (Am)
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 Lallent, with Duffin, 633 (Pl.)
 Lambert, L., 31 379 (Mal)
 Lambert, R. A., 534 (Hel), 596 (Musc.)
 — & de Oliveira, A. B., (950) (Mal)
 Lambert, S., 555 (Hel)
 Lambert, S. M., 417 (Musc.)
 Lamborn, W. A. 290 (Z)
 Landron, F. with Weiss, 502 (Sp.)
 Lane C., 605 (B.R.) 961 (Hel)
 Lane J. E., 289 (Hist.)
 Lange, J., with Jahnel, 175 (Y & S)
 de Langen, C. D., 163 (Dys.), 543 (Hel), 618 bis (Lep) 968 (Hel)
 — & Hermans, E., 1031 (Lep)
 — & Lichtenstein, A., 430 (B.R.)
 Langer E., 179 (Y & S)
 Langeron, J. 685 (Der)
 Langeron, M. 247 813 (Z)
 Langlois, L., with Flandia & Marchal, (949) (Mal)
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 Large W. T. H., 478 (Dys)
 La Rosa, G. 574 (Musc.)
 Larroque, F., 977 (Hel)
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 Laughinghouse, C. O.H., 739 (Rab.), 819 (Mal)
 Lawenberg, M., 707 (S.S.)
 Lavall & Pomaret, 340 (Lep)
 de Lavigne V., 135 (R.F.)
 Lavler G., (824) (Z)

- League of Nations, 185 (S.S.) 904 (Mal.)
 League of Nations Monthly Epidemiological
 Report, (101) (Pl.) 450 (Fev)
 Leake, W. H. with Berman, 585 (Misc.)
 Leao A. E. de A. 760 (Myc.)
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 (Mal.)
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 Lefrou G. 48 (Fev)
 Lega, G., 830 (Mal.)
 Le Gac, 457 (Fev)
 Legac, P. with Bouffard, 818 (Z.)
 Legendre, A., Mondain A. & Razafindra
 mamba, 949 (Mal.)
 Legendre P. M. A. & Mondain, A. 379 (Mal.)
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 (Z.) 296 (309) (Y.F.) 329 (K.A.) 336
 (Lep.) (600) (Misc.)
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 — & Markowski, S. 221 225 (Rab.)
 — with — 735 737 (Rab.)
 — & Weisbrod, B. 221 (Rab.)
 Leiper R. T. 538 (Hel.)
 Leisermann, L. I. 377 (Mal.)
 Leitch, J. N. 957 (B.R.)
 Leite, A. L. 649 (Y.F.)
 Lemaire, E. 471 (Am.)
 Le Mellour with Jourdan, 964 (Bb.)
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 Lenzkaya G. 641 (Pl.)
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 Leprieu E. 384 (Mal.)
 LePrince, J. A. & Johnson, H. A. 919 (Mal.)
 Leprosy Notes 331 613 1032 (Lep.)
 Lerat, R. 328 (K.A.)
 Leroy D. with Voizard 107 (Der.)
 Leslar J. E. with Fletcher & Lowthwaite
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 Lester H. M. O., with Johnson 701 (S.S.)
 — & Lloyd, L. 263 (Z.)
 Lestoquard F. with Donatien 755 (K.A.)
 — with — & Parrot, 755 (K.A.)
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 Li, C. & Faust, E. C. 539 (Hel.)
 Lian, S. B. 504 (Oph.)
 Liehtenstein A. 373 (Mal.) 1018 (Bl.)
 — with de Langen 430 (B.R.)
 Lie H. P. 811 (Lep.)
 Leibman E. with Kligler 364 (Mal.)
 Liégeois R. with Le Bourdellès 383 941
 (Mal.)
 — with — & Ollivier 474 (Am.)
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 Limbor 652 (R.F.)
 Limousin H. with Trotsier Deschamps &
 Delorme 556 (Hel.)
 Lindtrop, H. 58 (Und.)
 v. Lingen A. A., (642) (Pl.)
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 Lins, S. A. 993 (Y.F.)
 Lintz A. & Pardeiras D. (1008) (Y.F.)
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 157 (Dys.)
 Lisgunowa A. W. 420 421 (Misc.)
 Lissner L. 856 (Y & S)
 Lisovsky L. L. with Schourenkova, 232 (Z.)
 Lister F. S. 393 (Lab.)
 Liu H. L. 536 (Hel.)
 Liu K. B. 150 (Am.)
 Livierato S. & Vagliano M. 452 (Fev)
 Ljachowetzky A. M. 377 (Mal.)
 Lloyd L. with Johnson, 239 (Z.)
 — with Lester 263 (Z.)
 Lloyd, R. B. 593 (Misc.)
 — Napier L. E. & Paul S. N. 744 (h.A.)
 — & Paul S. N. 319 bis (K.A.)
 Lloyd W. D. M. with Sawyer & Kitchen
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 Lodato G. (258) (Z.) (600) (Misc.)
 Loevenhart, A. S. with Stratman Thomas
 186 189 (S.S.)
 Löffler W. 826 (Und.)
 Loganadan, A. D., assisted by Fernandez
 E. C. 806 (Dys.)
 Lokhov M. with Semikoz, 641 (Pl.)
 Lommel J. 479 (Dys.)
 Long Island Medical Journal, 219 (Rab.)
 Lopez Rital, L. 340 (Bb.)
 Lorando N., 666 (R.F.)
 Loreti F. 372 (Mal.)
 Losabridse, E. 970 (Hel.)
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 Low G. C. 480 (Sp.)
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 Lowe, J. 813 1037 (Lep.)
 Lowenberg, K. 220 (Rab.)
 Losano P. & Peña, M. 651 (R.F.)
 de Luca, B. 21 (Mal.)
 Luengo Garcia, F. 1035 (Lep.)
 di Lullo O. 686 (Der.)
 di Lullo O. 109 (Der.)
 Lumbau D. with Fermi, 729 (Rab.)
 Lumbroso U. with Sparrow & Lapidari, 665
 (R.F.)
 Luna Galian, J. 12 (Mal.)
 Lunevski with Ballif 381 (Mal.)

Larje, M., Rosenblatt, A. & Kossarow N
891 (Dya.)
Lusena, M., 768 (Myc.)
Lwuff, M., 236 (Z.)
Lynch, K. M., 232 (Z.)

M

McAlpine, J. G. & Mickle, F. L., 70 (Und.)
— & Sianotz, C. A., 74 (Und.)
MacArthur, W. P., 810 (Z.)
McCann, W. S., with Hunt, Rowntree,
Voeglin & Eggleston, 378 (Mal.)
McCarrison, R., 306 (Misc.)
McClelland, P. H., with Cannon, (524) bis (Z.)
McCormack, A. T., 919 (Mal.)
McCuchoch, W. E., 109 (Der.)
McCutcheon, O., 909 (Mal.) 1017 (BL.)
McDaniel, J. C., 404 (Lab.)
McDermott, E. N., 136 (Fev.)
McGivran, E. G., with Augustine, Nasmi &
Helmy 553 (Hel.)
McGrath, M. J., 478 (Dya.)
McGuire, C., with Acton, 682 (Der.)
Macht, D. I., 619 (Lep.)
M'Hutchinson, G. B. & Duff, W. R., 18 (Mal.)
Machwilde, N., 357, 802 (Pol.) 357 (Mal.)
McIntosh, J. A., 181 (G. V.)
McKendrick, A. G., 218 725 (Rab.)
Mackenzie, I. 9 (Mal.)
Mackenzie, J., 668 (B. R.)
Mackenzie, R., 547 (Hel.)
Mackie F. P., 363 (Lab.) 501 (Sp.)
— & Chitre, G. D., 466, 496 (Sp.)
— & Faurey, N. H., 500 (Sp.)
— with — & Billimoria, 491 (Sp.)
— & Gerd, S. N., 501 (Sp.)
— & Wada, J. H., 497 (Sp.)
McKinley E. B., 673 (R.F.)
Mackinnon, J. R., with Talica, 761 (Myc.)
McKnight, R. B., 469 (Am.)
Mackinnon, G., 695 696 709 (S. S.)
Macnally A. S., 567 (Misc.)
Macphail, N. P., 16 (Mal.) 271 (Z.)
Macridi, N. G., 834 (Fev.)
MacRobert, R. G., 705 (S.S.)
Madras, 908 (Mal.)
Madson, T., 58 (Und.)
— & Jensen, K. A., 690 (Dya.)
de Magalhães, O., 278 (Z.) 768 (Myc.)
Magath, T. B., 839 (Hel.)
— & Ward, C. B., 145 bis (Am.)
Magid, M. L., 337 (Mal.)
Magnitsky W. J. & Gutzwitsch, A. W., 816
(Z.)
Mahler, P., 483 (Dya.)
Majid, A., with Young, (258) (Z.), (951) (Mal.)
Majumdar A. R., 19 934 (Mal.)
Makaroff, A. K., 820 (Z.)
Mallin, A., with Hermann, 9 (Mal.)
Malone, R. H., 723 (Rab.)
Mamal, A., 594 (Misc.)
Mansel, C., 367 (Mal.)
Mandoul, 813 (Z.)
Manieri, A. & Gon, P., 663 (R.F.)
Manin, Y., with Levaditi & Anderson, 879
(Misc.)

Manoussian, Y. & Viale, J., 217 218, 726
(Rab.)
Manousakhs, E., 41 (842) (Fev.)
— with Blanc & Caminopetros, 43 (Fev.)
Mansfield-Aders, W., 397 (Lab.)
Manson-Bahr, P., 159 (Dya.) 375 945 (Mal.)
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— & Kilner, T. P., 879 (Am.)
— & Wilkoughby, H. M., 145 873 (Am.)
825 (Und.)
Manuwa, S. L. A., 268 (Z.)
Manwell, R. D., 801 (Z.)
— with Hegner & Shaw Jr., 24 (Mal.)
Maplestone, P. A., 545 548, 553 (Hel.)
Marcandier, with Plary & Marcon, 457 (Fev.)
Marcel, with Sartory & Mayer, 683 (Der.)
Marchal, G., with Flandin & Langlois, (949)
(Mal.)
Marchisava, E., 80 (B.R.)
Marchoux, E., 1005 (Y.F.), 1006 (Lep.)
Marçon, with Plary, 457 (Fev.)
— with — & Marcandier, 457 (Fev.)
Marchal, H., (950) (Mal.)
Marghese, P., 737 (Rab.) 944 (Mal.)
Maria Macera, J. & Carreno, C., (903) (Hel.)
Marie, A. C., 729 (Rab.)
— & Moternich, S., 217 (Rab.)
Martin, R. A., with Costa Mandry, 486 (Am.)
— with Hoffman & Burke, 544 (Hel.)
Marino V., 633 (Pl.)
Markhuna, J., 617 621 bis (Lep.)
Markoff, W., 114 (R.F.)
Markowski, S. & Legcynski, S., 221 225, 725,
737 (Rab.)
Marnette, H., 340 (344) 621 (Lep.)
Marquand, G., 573 (Misc.)
Marras, A. & Fran, A., 1042 (Lep.)
Marras F. M., 631 (Chl.)
Martelli, B. N. & Mascagni, G., 25 (Mal.)
Martens, A. H. A. & Koers, C. H., 235 (Z.)
Martin, E., with Roch & Mooschikova, 63
(Und.)
Martin, H., 175 (Y. & S.)
Martin, P. H., with Low & Cooke, 1023 (Bl.)
Martindale, W. H., 470 (Am.)
Martinez Cepa, with Pittaluga, Torrijos &
Ghies, 917 (Mal.)
Martini, E., 35 (Mal.) 81 (B.R.) 588 (Misc.)
(824) (Z.)
Maruschewitz, M., 365 (Mal.)
Marzibowsky E. I., 325 (K.A.)
— Pickool, J. N. & Balaschewa, M. T.
373 (Mal.)
Masataka, M. & Tetryo, T., (344) (Lep.)
Mascagni, G., with Martelli, 25 (Mal.)
Masse, M., 322 (Mal.)
Massia, C., 220 (Rab.)
Massot, M., with Giraud, 316 (K.A.)
Matheson, R. & Hinman, E. H., 813 (Z.)
Mathewson, S. T., 227 (Z.)
Mathis, C., 116 bis (R.F.)
— with Nicolle & Anderson, (129) (R.F.)
— with Solerda, 447 (Y.F.)
Mathis, M., 814 (Z.)
Matjuschenko, B., (38) (Mal.)
Matsumoto, K., Ando K. & Shikawa, T., 87
(Chl.)
— & Seki, T., 481 (Dya.)

- Matsumura, S., 985 (Bb.)
 — Kakinuma, G. Kawashima K. Teru
 kawa, K., Ochiai, S. Miyata R. Fujisaki
 K., Kanaz, R. Noguchi K. Aoki, K.
 Sato T., Ito K. & Suzuki M. 965 (Bb.)
 Matwoka, F., (600) (Misc.)
 da Matta, A. 610 (625) bis (1044) bis (Lep.)
 Mattos A. 163 (Dys.)
 Maurer S. with Richter & Eyl 540 (Hel.)
 Maurice, G. K., 700 (S.S.)
 Maxcy R. F., 578 (Mal.)
 Maxwell, J. L. 532, 539 (Lep.) 511 (B.R.)
 578 (Misc.)
 Mayeda, S. 568 (Misc.)
 Mayer M., 196 (S.S.) (523) (524) (Z.) 753
 (K.A.) 783 (B.R.)
 — with Sartory & Marcel, 683 (Der.)
 Mayne B. (38 bis) (Mal.) 253 (Z.)
 Mayr J. K. 585 (Mal.)
 Maiza, S. 22 (Mal.)
 — & Richard, E. R. 366 (Mal.)
 — & Trelles R. (38) (Mal.)
 Mazzeo M. 484 (Dys.)
 Mebias, J. 964 (Bb.)
 Medeiros, M. 102 (Der.)
 Medical Journal of Australia, 773 (Z.)
 Medical & Scientific Archives of the Adelaide
 Hospital, 481 (Fev.) 776 (Z.)
 Medemariachewili L., (950) (Mal.)
 Megaw J. W. D. Bhattacharji S. P. & Paul,
 H. K. 353 (Bb.)
 — Ghosh, S. & Chatterjee N. R. 23 (Mal.)
 — & Rao S. S. 49 (Fev.)
 Meihuizen F. H., (388) (Mal.) 634 (Pl.)
 Meillon B. with Ingram, 809 (Z.)
 Meleury H. E. 117 661 (R.F.)
 — Bishop E. L. & Roberts F. L. 919
 (Mal.)
 Melkisson, E. (678) (Fev.)
 Mello A. de S. (309) ter (Y.F.)
 de Mello E. J., 998 (Y.F.) 1032 (Lep.)
 de Mello F., 149 (Am.) 833 (Mal.)
 — & da Cruz L. J. C. 475 878 (Am.)
 — & Fladho A. 123 (R.F.)
 — & Pacheco de Figueiredo F. (489) (Dys.)
 — & Vervencar H. P. 25 (Mal.)
 Melnotte P. (185) (Dys.)
 — with Deschamps 463 (Am.)
 — with Lacaze 488 (Am.)
 Mendelson, R. W. 102 (Der.)
 — with Castellani, 866 (G.V.)
 Mendes N. O. with de Assis 156 (Dys.)
 Mendonça-Guason M. P. 152 (Dys.)
 Menk, W. 16 (Mal.) 404 (Lab.) 1013 (Bl.)
 Menze, C. 867 (B.R.)
 Menten, M. L. & Krugth, H. M. (489) (Dys.)
 Menton, J., 185, 890 (Dys.)
 Merighi, G. with Schiassi, 19 (Mal.)
 Merrill, J. with Hein, 960 (Pel.)
 Mertens W. K. 583 (Misc.)
 Meslay-Collre & Cocher 330 (K.A.)
 Mesnard, J. 327 (h.A.) 539 (Misc.)
 Metcalf, M. M. 785 (Z.)
 Metalkin, A. 524 (Z.)
 Mélikine A. 609 (Lep.)
 Metzger H. (489) (Dys.)
 Mexico 425 (B.R.)
 Meyer H., 802 (Z.)
 Mige S. with Finik, 796 (Rab.)
 Michael, J. C. (890) (Der.)
 Michailowa M. A. & Oudintzev G. N. 240
 (Z.)
 Michel P. with Gaté 862 (C.Bu.)
 Michelson E. 800 (Z.)
 Mickle F. L. with McAlpine 70 (Und.)
 Miesner H. & Haars G. 225 (Rab.)
 Migneco G. with Sanfilippo 445 (Und.)
 Miguens J. 493 (Sp.)
 Mikawa T. Nomura G. & Harada A. (950)
 (Mal.)
 Millan Muñoz J. (389) (Mal.)
 Miller Jr H. St. & Dawley C. W. 540 (Hel.)
 Miller J. E. 841 (Fev.)
 Miller M. W. 150 (Am.)
 Milne C. J. 581 (Misc.)
 Minamizaki T. 556 (Hel.)
 Molina R. P. (330) (K.A.)
 Miniroli A. 34 (Mal.)
 — & Hackett L. W. (824) (Z.)
 — & Siniscalchi R. (850) (Mal.)
 Minura, J. N. (1044) (Lep.)
 Misuraca, S. 56 (Und.)
 Mithard, L. with Boulay & Lhuere 24 (Ma.)
 Mitchell, J. 964 (Bb.)
 Mittra A. C. 572 (Misc.)
 Mitrofanova, J. (824) (Z.)
 Mitrophanova J. with Beklemishev 251 (Z.)
 Mitsuhashi C. 163 (Dys.)
 Mittra, P. with Cochrane 340 (Lep.)
 Miyaji S. & Imai B. 535 (Hel.)
 Miyata, R. with Matsumura et al 965 (Bb.)
 Mochtar A. 132 (R.F.)
 Moghilevskaya B. with Zlatogoroff 69 (Pl.)
 Moghilewakaja, B. 1 with Zlatogoroff 640
 (Pl.)
 Moghilevskaya B. with Zlatogoroff 640 (Pl.)
 Molodtsova, P. 642 (Pl.)
 Monacelli M. 336 (Lep.)
 Moncarey 534 (Hel.)
 Moncorvo F. 293 (Y.F.)
 Moodan A. with Legendre 379 (Mal.)
 — with — & Rasalindramamba 949
 (Mal.)
 Mondini E. M. (388) (Mal.)
 Monedjikova, V. with Roch & Martin 63
 (Und.)
 Monje C. & Weiss P. 55 (Fev.)
 Monteiro J. L. 698 (Y.F.)
 Montel L. R. 851 (Y & S.)
 Montel, M. L. R. 472 (Am.)
 — & Vielle A. 147 (Am.)
 Montes Pareja J. 882 (Am.)
 Montgomery H. (344) (Lep.)
 Montpeller J. Catanel A. & Cattolir 769
 (Myc.)
 Mosser H., 50 (Fev.) 738 (Rab.)
 Moss A. D. 408 (Misc.)
 Morales Villazón, N. with Uriarte 635 (Pl.)
 Moralis P. A. 1030 (Bl.)
 Morel C. & Tapie J. 873 (Am.)
 Morin, H. G. S. (35) (Mal.)
 — & Piro, R. 455 (Fev.)
 Morishita, K. 718 (S. S.)
 Morrison, J., 222 (Rab.)
 — with Choudhury 901 (Dys.)
 Moritsch, P. & Pirkner H. 274 (Z.)
 Morlaes H., 391 (Lab.)
 Morrison, N. 275 (Z.)
 Morton, H. M. 507 (Oph.)
 Mowca, A. 597 (Misc.) 1004 (Y.F.)

- Monkwin, J. A., 823 (Z.)
 Motta, C., 328 (K.A.)
 Motta, J., 613 (Lep.)
 Mouchet, R., 293 (Y.F.)
 Mount, P. P., 824 (Z.)
 Mounier with Gairn & Doubrow, 891 (Hel.)
 Mooteoide K., 837 (Fev.)
 Mischodhise, W., 950 (Mal.)
 Moffet, P. P., 377 918 (Mal.)
 Mopple, A., 895 (Dys.)
 Muhlman, P., 583 (Misc.) 702 (S.S.) 900 (Dys.)
 — with DeBanco & Vogel, 934 (Hel.)
 Muir, R., 612 (Lep.)
 — & Henderson, J. M., 1036 (Lep.)
 Muller F. W. with Webb, 728 (Rab.)
 Muller M., 281 (Hist.)
 Molluck, M. N. with Chopra & Gupta, 171 (Y & S.)
 — with Napier, 321 (K.A.)
 Mulligan H. W., 936 (Mal.)
 Mumz, J. with da Cunha, 55 483 (Fev.)
 (258) (Z.) 295 303 308, 646 (Y.F.) (907) (Dys.)
 Murakami, K., 887 (Dys.)
 Murayama, I., 685 (R.P.)
 Murgatroyd, F. with Owen, 1016 (Bl.)
 Murphy E. E., 919 (Mal.)
 Murphy R. A. with Strickland, Chowdhury
 Dodds-Price Forsyth, Smith & Williams,
 4 (Mal.)
 Mutermakch, S. with Marie, 217 (Rab.)
 Mya, T., 647 (Hel.)
 Myers J. G., 816 (Z.)

N

- Nag, S. C., 1026 (Bl.)
 Nageli, T., 782 (B.R.)
 Naeelund, C. & Ströman, R., 91 (Pl.)
 Nagai, S., with Ogata & Unno, 53 (Fev.)
 Nagata, S. with Tsuchiya, 487 (Dys.)
 Nagayo M., 827 (Hel.)
 Nagura, L., 783 (Z.)
 Nakamura, H. with Sazerac, 134 (R.P.)
 Nakamura, S., 158 (Fev.)
 Nakhapetoff, M. I., with Dunow, 65 (Und.)
 Nankawa, H., 377 (Mal.)
 Nanta, A., 706 (Myc.)
 Napier, L. E., 318 319 321 743 (K.A.)
 — & Henderson, J. M., 1036 (Lep.)
 — with Lloyd & Paul, 744 (K.A.)
 — & Molluck, M. N., 321 (K.A.)
 Narayanan, R. S., 228 (Rab.)
 Nares, E. C. & Koloid, C. A., 878 (Am.)
 Natar, R. with Casenod, 805 (Oph.)
 Nathan, H., 857 (Hel.)
 Nattas-Larner, L. & Lépine, P., 202 (S.S.)
 — Ramon, G. & Lépine, P., 206 (S.S.)
 Nasack, E. G., 167 (B.R.) 781 (Z.)
 Navarro, A. & Spangenberg, J. J., 927 (Mal.)
 Navarro-Martín, A., 380 (Mal.)
 Nazario, R. C. R., 925 (Mal.)
 Nazmi, M., with Augustus, Helmy & McGav-
 ran, 883 (Hel.)
 — with Khalil, Peter El Dén & El Betash,
 972 (Hel.)
 Neff, M. E. A., 1036 (Lep.)
 — & Smodgrass, R. J., 1035 1036 (Lep.)
 Nelis, P. with Beserman, 133 (R.F.)

- Neri, F., 255 (Z.)
 Netter, L., 827 (Mal.)
 Neuber, E., 933 (Hel.)
 Neves, A., 684 685 (Der.)
 Neves, J. S. & Ornelas, A., 363 (Mal.)
 Neveu Lemaire, M., with Brumpt, 434 (B.R.)
 — & Pellegrin, J., 791 (Z.)
 Newham, H. B., 703 (S.S.)
 — & Harvey, F. M., 561 (Misc.)
 Newman, B. M. with Barber & Kemp, 839 (Mal.)
 Newman, R. E. U., 485 (Dys.)
 Nicholas, M. J. with Cunningham & Lakh,
 219 (Rab.)
 Nicholls, L., 274 (Z.)
 Nicholson, D., 889 (Hel.)
 Nicolas Pavre & Lebeuf, 802 (C.B.)
 Nicolas, C., 419 (Misc.) 456 (Fev.)
 Nicolas, J., Lebeuf, P. & Roosset, J., 803 (C.B.)
 Nicolas, S., 218 (Rab.)
 — Dimancenco-Nicolau, O. & Galloway,
 I. A., 727 (Rab.)
 — & Serbanescu, V., 218 (Rab.)
 Nicolle, C., 456 (Fev.)
 — & Anderson, C., 116 118, 657, 659,
 668 (668) 848 (R.F.) 740 (K.A.)
 — & Colas-Bekour, J., 119 658,
 668 (R.F.)
 — & Hornum, P., 687 (R.F.)
 — & Rahal, M., 657 (R.F.)
 —, Mathis, C. & Anderson, C., (128) (R.F.)
 Nicolle, P., 119 (R.F.)
 Nicolisky, W. W., with Demina, 252 (Z.)
 Nigeria, 174 (Y & S.)
 — Ann. Rep. African Hospital Laboratory,
 391 (Lab.)
 — Ann. Rep. Med. Res. Inst., 300 (Lab.)
 Nido, F. L., 475 (Am.) (480) (Dys.) 704, 705 (S.S.)
 Nishibe, M., with Ando, 217 (Rab.)
 Nissenbaum, B., 834 (Mal.)
 van Nispen, R., 854 (Y & S.)
 — with Jean, 11 (Mal.)
 Nocht, R., 414 (Misc.)
 — & Kilbath, W., 1028 (Bl.)
 Noel, P., 111 (Der.)
 Noguchi, H., 84 483 (Fev.)
 Noguchi, K. with Matsumura et al., 965 (Bl.)
 — Shannon, R. C. Tilden, E. B. &
 Tyler, J. R., 849 (Fev.)
 Köller, W., 75 (B.R.)
 Nomura, G. with Mikawa & Harada, 808 (Mal.)
 Norrnet, L., Urbain, A. & Chaillet, L., 894 (Dys.)
 Notton, H. E. F., with Eyre & Pope, 847 (Misc.)
 Nowland, R. H., 46 (Fev.)
 de Nucci, L. S., with Bruchmann, 487 (Dys.)
 Néfex, A. with Rickard & Quarta, 930 (Mal.)

O

- Ochi, S., 831 (Hel.)
 Ochli, S. with Matsumura et al., 965 (Bl.)
 Ocho, G. W., 500 (Misc.)
 O'Connor, F. W. & Burke, G. R., 983 (Bl.)
 Oekonomides, G. D., 835 (Fev.)

O'Flynn, J. A. 6 (Mal.)
Office International d'Hygiène Publique
85 (Pl.)

Ogata, N., Nagai S & Unno S 53 (Fev)
Oh, H. Y. 547 (Hel.)
Ohba, T. 556 (Hel.)
Ohmichi N., 341 (Lep.)
Okell, C. C. with Blake, 482, 886 (Dys.)
Okropiridae, B. with Kandelaki & Abuladze
(949) (Mal.)
Oltzki, L. & Reich, H. 899 (Dys.)
Olivin, N. with Pozzo (488) (Dys.)
Oliveira, R. (600) (Misc.)
de Oliveira, A. B. with Lambert, (950) (Mal.)
Olivier P. H. & Hulsehoff A. A., 20 (Mal.)
Olivier M. with Le Bourdellès & Liégeois
474 (Am.)
Olmer D., 458 (Fev)
— with Burnet, 49 (Fev)
— with — & Durand, 460 bis (Fev)
— & Olmer J., 458 (Fev)
Olpp 622 (Lep.)
Ongkibong, H. F., 902 (Dys.)
— with Brunnekreef, 665 (R.F.)
Oncato, R. 686 (R.F.)
Onay Bey A. 871 (Hel.)
Orenstein, A. J., 532 (Hel.)
Ornelas, A., with Neves, 363 (Mal.)
Oer W. B. F. with Sinton & Ahmad 381
(Mal.)
— with — & Bird, 380 (Mal.)
Ortega Corrochano D. 315 (K.A.)
Otake M., 551 (Hel.)
Otero, F. 898 (1008) ter (Y.F.)
Otero P. M., 91 (Pl.)
Ott 461 (Fev)
Otto G. F. with Cort & Spindler 883 (Hel.)
Otto R. 778, 779 (Z.)
Ortolenghi, D. with Bonalberti & Brighenti
D. 913 (Mal.)
— & Brotru G. 623 948 (Mal.)
Ouchakow W. G. 735 (Rab.)
Ouard with Darguin, 469 (Am.)
Oodintsew G. N., with Michailowa 240 (Z.)
Ouzilleu P. (824) (Z.)
Owen, D. U. 384 (Mal.) 577 (Misc.)
— & Murgatroyd, F. 1016 (Bl.)
Owajannikowa, O. W. with Rosenholz &
Tredlow 113 (R.F.)
Ozawa, M. 536 972 (Hel.)

P

di Pace, L. (953) (Mal.)
Pacheco G. 567 (Misc.)
— with Fialho & Bicalho 300 (Y.F.)
Pacheco de Figueiredo F. with de Mello
(489) (Dys.)
Padua, R. G., 10 (Mal.)
Page I. H. Turner K. B. & Wilson, J. H.,
692 (Misc.)
Pal, M. N. 482 (Fev)
Paddock, A., 1039 1042 (Lep.)
Palentine, 365 bis (Mal.) 403 (Lab.)
Palma, M. D., 21 (Mal.)
Palmer F. J. 108 (Der.) (632) (Chl.)
Pampena, E. J. 272 (Z.) 585 (Misc.)
— with Alexandrini 574 575 (Misc.)

Panayotatou (112) (Der.) 328 (K.A.) 803
(Z.) 871 (Am.)
Pani M. 646 (Y.F.)
Paoletti U. 396 (Mal.)
Papadopoulos J. with Petrotakis 767 769
(Myc.)
Papadopoulos T. Yoel, M. & Hadjigeorgas A.
835 (Fev)
Papanikolaou B. 837 (Fev)
Pappalardo C. 149 (Am.) (903) (Dys.)
Paradiso F. 746 (K.A.)
Parker W. G. 447 (Und.)
Parmanand, M. J., (876) (Fev)
Parreiras D. (642) (Pl.)
— with Lintz, (1008) (Y.F.)
Parrot, L. 257 266 (Z.) 748 754 ter (K.A.)
— with Donatien & Lestoquard 753 (K.A.)
— with Sergeant, Edm. & Et. 693 (B.R.)
— with — Foley & Catanei 382 383
(Mal.)
— with — — — & Senevet 3
(Mal.)
Parsons R. P. 179 (Y. & S.)
Pasqual J. H. 173 (Y. & S.)
Pasteur F. with Phisalix, 274 (Z.) 733 (Rab.)
Patané C. 315 (K.A.)
do Patco, Jr. J. D. with Gomes 617 (Lep.)
Paterni, L. (950) bis (Mal.) 1019 (Bl.)
Paternon A. R. (33) (383) (Mal.) 406 (Misc.)
Patterson, S. W. 529 (Hel.)
Paul, B. K., with Megaw & Bhattacharji
333 (Bb.)
Paul S. N. with Lloyd 319 bis (K.A.)
— with — & Napier 744 (K.A.)
Pawan J. L. 237 (Z.) 563 (Misc.)
Pawlowski E. N. 266 (Z.)
Pawlowsky E. N. 790 (Z.)
— & Stein, A. K. 264 (Z.)
— & — with Perfiljew P. P., 247 (Z.)
Payne G. C. 553 (Hel.)
Pearse A. S. 264 (Z.)
Pecori G. & Escalar G. 34 (Mal.)
Pedrazzi A. 723 (S.S.)
Peel, A. A. F. 768 (Myc.)
Peitrier 591 (Misc.)
Peking Union Medical College 867 (B.R.)
Pelle, A. & Le Baron 470 (Am.)
Pellegrin, J. with Neveu Lemaire 781 (Z.)
Peltier M. 617 (Lep.)
Peña, M. with Lozano 651 (R.F.)
Peña Chavarria, A. 763 (Myc.) (950) (Mal.)
Penfold W. J. & Corkill, A. B. 52 (Fev)
Penido J. C. N. 300 (Y.F.)
Penna, O. & de Figueiredo B. (1008) (Y.F.)
de Penning, H. C. 12 (Mal.)
Peralta Ramos, A. 336 (Lep.)
Pérard, C. 803 (Z.)
Perekropoff G. J. 28 (Mal.)
Perekropow G. J. 28 946 (Mal.)
Perez Pardo, J. 228 (Rab.)
Perfiljew P. P. 257 (Z.)
— with Pawlowsky & Stein, 247 (Z.)
Pergher G. with Sanarelli 669 bis (R.F.)
Perry H. M. & Bensted, H. J. 897 (Dys.)
973 (Hel.)
Pernahd, J. with Hance 580 (Misc.)
Peruchena J. G. 781 (Myc.)
Peruzzi, M. 573 (Misc.) 623 (Z.)
Pervis, 39 (Fev)
Peryassé A. G. with Barreto 650 (Y.F.)

- Pessoa, S. B. with Gomes, 685 (Der)
 Peter F. M., 878 (Am.)
 — with Khahl, Narmel, El Din & El
 Betash, 972 (Hel.)
 Peterson, D. H., 794 (Z.)
 Peterson, R. A., 508 (Opk.)
 Petridis, 871 (Am.)
 Petridis, P., 581 (Misc.)
 Petrov V. P., 1043 (Lep.)
 Pettit, A., 1008 (Y.F.)
 — & Stefanopoulos G., 308 (Y.F.)
 — — & Finney, V., 307 (Y.F.)
 — — & Kolochine, C., 1007 (Y.F.)
 Petty W. S., 919 (Mal.)
 Petretakis, M., 468 (Am.) 578 (Misc.) (903)
 (Dys.)
 — & Papadopoulos J., 767 769 (Myc.)
 Peterson, R. A., 508 (Opk.)
 Peverelli, P., 83 627 632 *Ms* (Chl.) 528,
 969 (Hel.)
 Pevsner A. S., (950) (Mal.)
 Pezza, G., 942 (Mal.)
 Pflannenstiel, W. & Scharfaw B., 700 (S.S.)
 Phasas R. N., 847 (Fev.)
 Phelps, B. M., 16 (Mal.) 271 (Z.)
 Phelps E. B. & Davis, J. V., 162 (Dys.)
 Philip, C. B. (258) (Z.) 1003 (Y.F.)
 — with Hudson & Bancer, 647 (Y.F.)
 — with — & Davis, 1003 (Y.F.)
 Phillips, W., 636 (Pl.)
 Philpotschenko A., 712 (S.S.)
 Philpott, C. H., 793 (Z.)
 Phibalis, 739 (Rab.) 780 (Z.)
 — & Pasteur F., 274 (Z.) 738 (Rab.)
 Photakis, B. A., 878, (950) (Mal.)
 Photinos, T., 687 (Der.)
 Picado C., 942 (Mal.)
 Picard, F., 9 (Mal.)
 Pichat, J., 649 (Y.F.)
 Pickoul, I. N., 631 (R.F.)
 Pickoul, J. N., with Marzinsky & Balas-
 chews, 373 (Mal.)
 Pieri, J. with Bonnet & Duman, 49 439 (*Der*)
 (Fev.)
 Pierini, L. E., 338, 343 (Lep.)
 Pigulevsky S. W., 630 (Hel.)
 Pihel, K. V. with Chopra & Gupta, 664
 (Misc.)
 Pimentel, C., 970 (Hel.)
 Pin, M. with Blanchard, 948 (Mal.)
 Pinella, L., (960) (Mal.)
 Pinto G. de S., 10 (Mal.)
 — & Pinto B. F., 369 (Mal.)
 Pinto, W., 963 (Rab.)
 Piranal, E., (480) (Dys.)
 Pires, W. & Póvoa, H., 31 (Mal.)
 Pirker H. with Moritsch, 274 (Z.)
 Pirat, R. with Moen, 453 (Fev.)
 Pittaluga, Martinez Cepa, Torrijos & Gineá,
 917 (Mal.)
 Pittaluga, G. (309) (Y.F.)
 Plant, F., 113 (R.F.)
 Plavtsov K., 973 (Hel.)
 Plasy Marcandier & Marcon, 457 (Fev.)
 — & Marcon, 457 (Fev.)
 Pleha, A., 23 (Mal.)
 Plochmann, E., with Leschs, 478 (Dys.)
 Poddighe, A., 446 (Und.)
 Podypolskaya, V. P. with Scriabin &
 Schoulitz, (903) (Hel.)
 Poggi, L., (678) 842 (Fev.)
 Poldis, H., 122 (R.F.)
 Pomaret, with Lavall, 340 (Lep.)
 Ponomareff, A. W. & Solovieff, M. N., 722
 (Rab.)
 Ponomarew A. W., 481 (Dys.) 738 (Rab.)
 — & Solovieff N. N., 731 (Rab.)
 Pons-Leychard A., 328 (K.A.)
 Pontano, T., 452 (Fev.)
 del Ponte E., with Shannon, 248 (Z.)
 v Poór 357 (Pl.)
 ter Poortan, F. H., 870 (Am.)
 Pope, W. J., with Eyre & Motton, 867 (Misc.)
 Popow P., with Zehm, 490 (Sp.)
 Poppe, K., 442 (Und.)
 Porter A., 525 (Hel.) 824 (Z.)
 Portocallis, A. & Flora G., 453 (Fev.)
 Portola, 171 (A. & S.)
 Porto Rico Review of Public Health &
 Tropical Medicine, 1 *Ms* 27 366 (Mal.)
 Pousailloux, M., with Anberth, 671 (R.F.)
 Pouchan-Dallide, G., with Loderich, 880
 (Am.)
 Póvoa, H., with Pires, 31 (Mal.)
 Pozzi, A., 28 (Mal.)
 Pozzo, F. & Oliván, N., (480) (Dys.)
 Prado A., 21 (Mal.)
 Prigge, R. & Rothermundt, M., 114 (R.F.)
 di Primio, R., (950) *Ms* (Mal.)
 Pritze, F., 230 (Z.)
 Proste, 269 (Mal.)
 Protonowich, V. O., (330) (K.A.)
 Provera, G., 290 (Hist.)
 Provera, P., (824) (Z.)
 Pruthi, H. S., 246 (Z.)
 Przemycki, F., Lipowska, L. & Sierakowski,
 S., 157 (Dys.)
 Public Health Reports, 56 (Und.) 609 (Lep.)
 904 (Y.F.)
 Puchnin, F., 673 (Am.)
 Puente, J. J., 610 1034 (Lep.)
 Puff G., 685 (Der.)
 Puntoni, V., 222 (Rab.)
 Puri, I. M., 250 (258) (Z.)
 Puyal, J., 380 (Mal.)

Q

- Queta, P. D., with Richard & Nides, (908)
 (Mal.)
 Quintini, J., 783 (Z.)

R

- Rabbani, S. M., 13 (Mal.)
 Radama, W., 578 (Misc.)
 — & Joannes, M. L., 578 (Misc.)
 Raffaele, G., 241 (Z.)
 — with La Face, 254 (Z.)
 Ragazzi, C. A., (842) (Pl.)
 Raghava, S. N., (33) (Mal.)
 Ragu, with Brulé & Laporte, 880 (Am.)
 Rahal, M., with Nicolle & Anderson, 657
 (R.F.)
 Raimondi, S. & Canal Feijóo, E. J., 121 (R.F.)
 Ralston, G. W. & Severnac, M., 212 (S.S.)
 Ramon, G., with Nathan-Larrier & Lépine,
 208 (S.S.)

- Ramon Giner D 704 (S.S.)
 Ramos e Silva, J 103 111 (Der)
 Ramos Baer, P with Hoffmann, (1044) (Lep)
 Ramsay G W St. C. 334 (Lep.)
 Ramsine S., with Koenig 221 (Rab.)
 Ranganathan, K. S. 100 (Pl.)
 Rangol, M. 616 (Lep.)
 Ramerl, C., 977 (Hel.)
 Ranjeva, 1030 (Bl.)
 Rao, G R., 368 (Mal.) 599 (Misc.)
 Rao M. G R. 106 (Der)
 Rao S S. 545 (Hel.) 846 (Fev)
 — with Chopra, 984 (Hel.)
 — with Megaw 49 (Fev)
 Ratcliffe H. L. 234 (Z.) 381 (Mal.)
 Rauli Goyena J (165) (Dya.)
 Rault, with Volzard 666 (R.F.)
 Raynal, J 387 934 (Mal.) 526 (Hel.)
 — & Leger J 556 (Hel.)
 Raynard, L. & Colondeu, L. 328 (K.A.)
 Razafindramamba, with Legendre & Mondain 949 (Mal.)
 Rodaelli P 759 (Myc.)
 Reed, A. C. 924 (Mal.)
 Roeder J. E. 506 (Oph.)
 Rees, C. 798 (Z.)
 Rees, C. W., 473 (Am.)
 Reeves I. S. K. 344 (Lep.)
 Regendanz, P 128 (R.F.) 721 722 (S.S.) 884 (Am.) (1008) (Y.F.)
 — & Klueth, W 785 (Z.)
 Register J C., 105 (Der)
 Reich, K. with Olitski, 899 (Dys.)
 Reichenow E. 692 (B.R.)
 Reimann, H. A. with Hu & Kurotchkin, 765 (Myc.)
 — Kurotchkin T G & Tao E. 765 (Myc.)
 Reiss F., 1033 (Lep.)
 Reitani U with Chabreza, 52 (Fev)
 Reitter R. 382 (Mal.)
 — with Kilgler 384 922 (Mal.)
 — & Salternik, H. 811 (Z.)
 Remlinger P 140 (Am.) 217 725 (Rab.) 335 (825) (Lep.)
 — & Bailly J., 218, 222 224 736 bis 737 bis (Rab.)
 Renaud, M. 274 (Z.)
 República Argentina, 605 (B.R.)
 Revue de Médecine et d'Hygiène Tropicales 871 (Am.)
 Roy G B. with Bejarano & Abadia, (37) (Mal.)
 de Rozende C. (309) (Y.F.)
 Rshodorf G with Fischer 378 (Mal.)
 Ribeiro da Fonseca, O O 762 (Myc.)
 Rice, J P with Williams & Lacayo 284 (Hist.)
 Rice, T B. 728 (Rab.)
 Richardson W & Klumpp T G 495 (Sp.)
 Richter O Maurer S. & Eyl, M., 540 (Hel.)
 Richard E. R. 815 (Z.)
 — with Davis (949) (Mal.)
 — with Macra 366 (Mal.)
 — Quleta P D & Núñez A. (950) (Mal.)
 Ricklin, J., with Fourche 183 (S.S.)
 Ricou D 596 (Misc.)
 Riddell, W., 557 (Hel.)
 Ridley F 508 (Oph.)
 van Riel, 410 (Misc.)
 van Riemadijk, M 87 (Chl.)
 da Rin, O & Weinberger M., (74) (Und)
 Riqueau 807 (Z.)
 de Rivas D 789 (Z.)
 — & Fife C. A., 527 (Hel.) 787 (Z.)
 Robbins F C. 948 (Mal.)
 Robbins J H 361 (Mal.)
 Roberts, F L. with Meloney & Bishop 919 (Mal.)
 Robertson A. with Thomson 435 (B.R.)
 Robic, J 479 (Dya.)
 — with Girard, 861 (Y & S.)
 Robineau 815 (Lep.)
 Robinson, F E. 383 (Mal.)
 Roch, M. 820 (Z.)
 — Monedjkova V & Martin, E. 63 (Und)
 Rockefeller Foundation, 954 (B.R.)
 Rodenwaldt, E. 32 (Mal.)
 Rodhain J 110 688 (Der)
 Rodriguez J., 356 (Lep.)
 Rodriguez R., with Casas & de Buen, 314 (K.A.)
 Rodriguez Oliva R. 21 (Mal.)
 Roßio A. H. 1043 (Lep.)
 Rogers L. 83 (Chl.) 633 (Pl.) 953 (B.R.)
 Romiti C. 599 (Misc.)
 Ronnefeldt, F (950) (Mal.)
 Roppongi H., 777 (Z.)
 Roques, P (842) (Pl.)
 Rose F G 621 bis (Lep.)
 Rosenau, M J 228 (Rab.)
 Rosenbaum, S., (903) (Dya.)
 Rosenberg M., 842 (Fev)
 Rosenblatt, A. with Lurje & Kossarew 891 (Dys.)
 Rosengolz, H P with Stern 207 (S.S.)
 Rosenholz H. P Owsjannikowa O W & Treflow I A., 113 (R.F.)
 Roskin G & Schischliewa, S., 799 (Z.)
 Roskott, E. R. A. L., with Boune 927 (Mal.)
 — & Séro R. 20 (Mal.)
 Ross P 947 (Mal.)
 Ross, R., (38) 914 924 (Mal.) 168 427 956 (B.R.) 807 (Z.)
 Ross, W C. 313 (K.A.)
 Rossi G 914 (851) (Mal.)
 Rothermundt M. with Hartoch 682 (R.F.)
 — with Prigge, 114 (R.F.)
 Rotta, C. with Bastal 68 (Und.)
 Roubaud, E., 95 (Pl.) 256 808 (Z.)
 Roussel, J with Nicolas & Lebeuf 803 (C.Bu.)
 Row R., 381 383 935 bis (Mal.)
 Rowntree, L. G with Hunt, McCann Voegtlin & Eggleston 378 (Mal.)
 Roy A. C. with Boyd, 330 (K.A.)
 Roy D N., 686 (Der)
 Rochade, N (951) bis (Mal.)
 Rodolf G de M., 935 (Mal.)
 Rudolfs W & Lackey J B., 806 (Z.)
 Ruge H. 115 bis 128 135 (R.F.) 266 (Z.)
 Ruge, R. 9 (Mal.) 1009 (Hu.)
 Russell, P F 8 (Mal.)
 Russian Socialist Federal Soviet Republic 36 (Mal.)
 Rutledge W 819 (Z.)
 Ruys A. C., with Huipera, 674 (Fev)
 Ryrie G A 550 (Hel.)

- Sabatucci, M. 942 (Mal.)
 Sabrazas, J., 128 (R.F.)
 Sachs, H. & Klopstock, A., 541 (Hel.)
 Sacchi, J. J. 276 (Z.)
 Saenz, A. with Blanc, Caminopetros & Dumas, 838 (Fev.)
 Sagol, W. 654 (R.F.)
 Sainte-Marie P. E. F., 740 (Z.)
 Sakaguchi, T., 850 551 (Hel.)
 Sakurai H., (344) (Lep.)
 Saka, L. M. with Iriarte 864 (G.V.)
 Salterink, H. with Rettler 811 (Z.)
 Salle, A. J. & Schmidt, C. L. A., 329 (h.A.)
 Salminen, Y. W. 618 (Lep.)
 Salmon, W. D. Hays, I. M. & Guernant, N. B., 359 (Hel.)
 Salvoh, G. 156 (Dys.)
 Salberger M., 609 (Lep.)
 Samson, J. G. & Lara, C. R., 1036 (Lep.)
 Samarelli, G. 131 (R.F.)
 — & Pergher G. 609 bis (R.F.)
 Sanchez-Bayarri, V. 222 (Rab.)
 Sanders, E. P. 883 (Am.)
 Sanders, H. C. 257 (Z.)
 Sanderson, E. S. with Smith & Turner 783 (Myc.)
 Sandground, J. H. 971 (Hel.)
 Sando, D. V. 82 (B.R.)
 Sanfilippo E. 830 (Und.) 875 (Am.)
 — with Ascoli, 68, 830 (Und.)
 — & Migneco G. 443 (Und.)
 Sanford, M. F. with Light, 790 (Z.)
 Sanson, C. G. 588 (Musc.)
 Santos, J., (309) (Y.F.)
 Sarcar S. L. 5 (Mal.)
 Sarcinella, F. (555) (Hel.)
 Sarcocrofos, M. 451 (Fev.)
 Sardjito M., with Walsh, 281 bis (Z.)
 — M. & Zuehlke M. 670 (R.F.)
 Sartori, C. 444 (Und.)
 Sartorius F. 886 (Dys.)
 Sartory A. & R. Marcel & Mayer J. 683 (Der.)
 Sasaki R. 477 (Dys.)
 Sato A. 562 (Musc.)
 Sato Y. with Matsumura et al. 965 (Bb.)
 — & Shoji, K. 661 (Musc.)
 Satow T. 1043 (Lep.)
 Sayoon M. 471 (Am.)
 Saunders, A. M. with Hershfield, Hubler Colby Koenig & Schmid, 675 (Fev.)
 Saunders, G. F. Y. 705 (S.S.)
 Sautet, J. 166 (B.R.) 475 886 (Am.)
 — with Horowitz, 896 (Mal.)
 Savas, C. & Cardamatis, J. P. 428 (B.R.)
 Savazzi, G. with Guggis, 57 (Und.)
 Sawyer W. A. Lloyd, W. D. M. & Kitchen, S. F. 1007 (Y.F.)
 Sayra, E. G., 369 (Mal.)
 Sayrac, R. & Nakamura, H. 134 (R.F.)
 — & Vauze, R. 127 (R.F.)
 Schaechter E. P. with Aristowsky 127 (R.F.)
 Schafr M. M., 542 (Hel.)
 Schapiro, S., with Kritschewski, 470 (Musc.)
 Scharrf, J. W. 33 (Mal.)
 Scharf, B., with Pfannenstiel, 709 (S.S.)
 Schausmann, O. 878 (Am.)
 Schera, K. 722 (S.S.) 738 (Rab.)
 Schweifera, E. M., with Wobski, 927 936 (Mal.)
 Schwetschenko, F. L. 266 (Z.)
 — with Chodukin, 323 (h.A.)
 Schwetschenko P. J. with Soifer, 735 (h.A.)
 Schlass, F. & Merighi, G., 19 (Mal.)
 Schiff, E., 485 (Dys.)
 Schilling, C. 721 (S.S.) 916 (951) (Mal.)
 — & Soliman G., 770 (S.S.)
 Schilling, V., 524 bis (Z.)
 Schirwindt, S. L., 618 (Lep.)
 Schischilakawa, S., with Roalka, 799 (Z.)
 Schiessberger H., 123 (Fev.)
 — & Wichmann, F. W., 664 (R.F.)
 Schiessmann, K., 1042 (Lep.)
 Schiessmann, L. F., 621 (Z.)
 Schmidt, O. W., with Hershfield, Hubler Colby Koenig & Saunders, 675 (Fev.)
 Schmidt, C. L. A. with Salle, 259 (h.A.)
 Schmidt, H., 609 (Musc.)
 Schmidt, F. J. W. 15 (Mal.)
 Schmoor, S., 39 (Fev.)
 Schneider J. 947 (Mal.)
 Schmittner R. & Silberstein W., 203 (S.S.)
 Schöbl, 172 (Z. & S.)
 Schöbl, O. & Villasmil, R., 155 (Dys.)
 Schockaert, J. 119 (R.F.) 125 (Fev.)
 Schowitz, R. S. with Scriabine & Podypolskaya, (993) (Hel.)
 Schoorenkova, A. I. & Lisovsky I. L., 22 (Z.)
 Schoute, E. with de Beck & Swellengrebel, (824) (Z.) 915 (Mal.)
 Schronpf Pierron P., 840 (Fev.) 872 (Am.)
 Schuchat, J. A., with Gromaschewski J. A. 268 (Z.)
 Schüffner W. 25 bis (Mal.)
 Schüffner W. A. P., with Dinger Sölders & Swellengrebel, 1006 (Y.F.)
 Schuk P. A., 43 (Fev.)
 Schult, R. E., 690 (Hel.)
 Schurman, C. J. & Hubink, A. S. B. 912 (Mal.)
 Schwarzmann, B., 1034 (Lep.)
 Schwarzmann, L. 675 (Fev.)
 — with Kritschewski, 420 (Musc.)
 Schweinburg, F., 216 (Rab.)
 — with Gerlach, 726 (Rab.)
 Schweizerische Medizinische Wochenschrift, 866 (Hel.)
 Schwetz, J., 749 (Z.)
 — with Collart, A. & Geernick, 829 (Mal.)
 Scordombaldi, E., with Charlotie, 838 (Fev.)
 Scott, G. H., with Cowdry 239 (Z.)
 Scott, J. A., 693 (Hel.)
 Scorsone I. & Warner W. P., 63 (Und.)
 Scriabine K. L., Podypolskaya, V. P. & Schoultr, R. S. (993) (Hel.)
 Scuderi, G., 146 (Am.)
 — & Baroni, B., 880 (Am.)
 Senger E. A., 1 bis (Mal.)
 Sebensow B. M., with Semorodinsw & Adowa, 812 (Z.)
 Sechl, E., 578 (Musc.)
 Secqum, F. 857 (Z. & S.)
 Seelmann, M. & Hadenfeldt, A., 443 (Und.)
 Segal, M. B., with Fried, 679 (Der.)
 Seifert, with Uhlenhuth, 671 (R.F.)
 Seki, T., with Matsumoto, 481 (Dys.)

- Seki Y. 489 (Dya.)
 Sellards A. W. & Mathus C., 647 (Y.F.)
 — & Siler J. F., 43 (Fev.)
 — with Theiler 306 (1. F.)
 Selwyn-Clarke, P. S., 644 (Y.F.)
 Semikoz, F. 641 (Pl.)
 — & Lokhov M., 641 (Pl.)
 Seminario C. & Gavita Alvarado E. R.,
 (1044) (Lep.)
 Sen, K. C. with Dhar 87 (Chl.)
 Sen, P. B. with Brahmachari, 559 (Misc.)
 Sen, R. T. with Hodgson, 322 (K.A.)
 — with — & Das, 321 (K.A.)
 Senevet, G. with Sergeant, Edm. & Et. Parrot,
 Foley & Catanei, 3 (Mal.)
 Senior White R., 245 246 (Z.)
 Sêno R., with Roakott, 20 (Mal.)
 Sensesich, R. L. & Giordano A. S., 60 (Und.)
 Sepaschwilli A., (951) (Mal.)
 Sepukri P. & Vidale E. 949 (Mal.)
 Sequera, J. H. 108 (Der.)
 Serbanescu V., with Nicolau, 218 (Rab.)
 Serafin S., with Habermann, (388) (Mal.)
 — with Heining, 335 (Mal.)
 Sergeant, Edm., 397 (Lab.)
 Sergeant, Edm. & Sergeant, Et., 946 (Mal.)
 — — & Parrot L. 693 (B.R.)
 — — Foley H. & Catanei, A., 382 383
 (Mal.)
 — — — & Senevet, G. 3 (Mal.)
 Sergi, A., (388) (Mal.)
 Serra A. 220 (Rab.) 492 (Sp.)
 Servidori G. (600) (Misc.)
 Sezhachalam, T. (600) (Misc.)
 Sette, N., (951) (Mal.)
 Severac M. with Raizies 212 (S.S.)
 do Sêzo S. with Tixier 134 672 (R.F.)
 Shaha, B. 22 (Mal.)
 Shannon, R. C. with Davis 253 (Z.) 1000
 (Y.F.)
 — with Noguchi Tilden & Tyler 849
 (Fev.)
 — & del Ponte E. 248 (Z.)
 Sharp W. B. & Taylor E. K. 680 (Der.)
 Sharpe W. S. 856 (Y & S.)
 Shattuck, G. C. 350 (Bb.) (600 bis) (Misc.)
 Shaw Jr E. H., 24 (Mal.)
 — with Hegner & Maxwell R. D. 24 (Mal.)
 Shaxby J. H. & Bonnell, H. E. 576 (Misc.)
 Shelmire B. 555 (Hel.)
 Shiozawa S. 130 bis (R.F.)
 Shirai, M. 529 (Hel.)
 Shiraiwa T. with Matsumoto & Ando 87
 (Chl.)
 Shircore J. O. (724) (S.S.)
 Shoji K., with Sato 561 (Misc.)
 Shortt, H. E. Craighead A. C. Smith R. O. A.
 & Swaminath, C. S. 322 323 (K.A.)
 — & Swaminath, C. S. 310 (K.A.)
 — d'Silva, H. A. H. & Swaminath, C. S.,
 325 (K.A.)
 — & Swaminath, C. S. 236 (Z.)
 Shounha A. T. & Aly M. 524 (Z.)
 Shu, H. J. 564 (Misc.)
 Shvarzman, M. (388) (Mal.)
 Sici A. & Vancel, M., 813 (Z.)
 Sierakowski, S. with Przemycki & Lipowska
 157 (Dya.)
 Silberstein, E., (824) (Z.)
 Silberstein E. 697 (R.F.) 795 (Z.)
 Silberstein W., with Schatzman, 273 (S.S.)
 Siler, J. F., with Serafin, 43 (Fev.)
 Silva, with d'Uva, 70 (K.A.)
 Silva, F., (360) (Pol.) 763 (Misc.)
 da Silva, F. V., 438 (Y & S.)
 d'Silva, H. A. H., with Shortt & Swaminath,
 325 (K.A.)
 da Silva, J. R., (600) (Misc.)
 da Silva, R., 138 (Fev.)
 Silveira, F. & Gomes, J. M., 1041 bis (Lep.)
 Silvestro L., 683 (Der.)
 Simanin, P., 28 (Mal.)
 Simanine P. L., with Smirnova, 28 (Mal.)
 Simmons, J. S. & St. John, J. H., (951) (Mal.)
 — with — & Gardner 988 (Hel.)
 Simmons R. J., 819 (Z.)
 Simonetti, F., 71 (Und.)
 Sims, L. C. with Gill & Kiker 919 (Mal.)
 Sinclair M. J., 553 (Hel.)
 Simicacchi, R., with Mimiroli, (940) (Mal.)
 Sinton, J. A., 255 256 815 (Z.)
 — & Barrand, P. J., 255 (Z.)
 — & Bird, W., 14 929 (Mal.)
 — — & Eate S. N., 379 (Mal.)
 — — & Orr W. B. F., 380 (Mal.)
 — with Christophers & Corvell, 360 (Mal.)
 — Orr W. B. F. & Ahmad, B., 381 (Mal.)
 Sivamani V., 13 (Mal.)
 Sivarambandan, R., 550 (Hel.)
 Skorodoumoff, 641 bis (Pl.)
 Skorodoumow A. 637 (Pl.)
 Slanetz C. A. with McAlpine 74 (Und.)
 de Smidt, F. P. G., 99 (Pl.)
 Smirnov G. 999 (Hel.)
 Smirnova, A. M. with Adowa, 814 (Z.)
 Smirnova, E. W. & Simanine P. L., 28 (Mal.)
 Smith D. C. Turner H. C. & Sanderson, E. S.
 763 (Myc.)
 Smith, E. C. 104 107 (Der.)
 — & Elmes B. G. T., 688 (Der.)
 Smith, H., 507 (Oph.)
 — with Strickland, Chowdury Dodds-
 Price Forsyth, Murphy & Williams 4
 (Mal.)
 Smith, H. S., 686 (Der.)
 Smith, M. with Isaacs & Sturgis 540 (Hel.)
 Smith N. M. & Barret H. P. 231 (Z.)
 Smith, R. O. A. with Shortt, Craighead &
 Swaminath, 322 323 (K.A.)
 Smith S., 848 (Fev.)
 Smithies F. 228 bis (Z.)
 Smiths E. with Baermann, 372 (Mal.)
 Smorodinsky I. A. & Adowa A. N. 814 (Z.)
 — Selenzow B. M. & Adowa, A. N.
 812 (Z.)
 Snijders E. P. with Dinger Schöffner &
 Swellengrebel 1006 (Y.F.)
 Snodgrass, R. J., with Neff 1035 1036 (Lep.)
 Soares P. (46) (Fev.)
 Société Médico-Chirurgicale de l'Ouest
 Africain Français (600) (Misc.)
 Soenlo R. 812 (Z.) 912 bis 928 (Mal.)
 — with Walsh, 911 (Mal.)
 Soffieff M. S., with Chodukine 324 (K.A.)
 Soffiewe M. S. & Schéwtschenko P. J. 755
 (K.A.)
 Solares A. 505 (Oph.)
 Soliani, G. 282 (Hist.)
 Sollazzo G. 714 (S.S.)
 — with Schilling 720 (S.S.)

- Solihni, A., 834 (Y & S)
 Solovieff, N. N., with Ponomareff, 732 (Rab.)
 Soloview N. N. with Ponomarew 731 (Rab.)
 Sorge, G. 929 (Mal.)
 Soru, E. 88 (Chl.)
 Southard, L., 632 (Chl.)
 South African Institute for Medical Research, 393 (Lab.)
 Southern Medical Journal 7 919 (Mal.)
 de Souza-Aranjo H. C., (1044) (Lep.)
 Spangenberg, J. J. with Navarro, 927 (Mal.)
 Sparrow H., with Lapklari, 120 (R.F.)
 — Lambroso, U. & Lapklari M. 665 (R.F.)
 Speedy W. D., (951) (Mal.)
 Spillmann, (344) (Lep.)
 Spindler L. A. with Cort & Otto 965 (Hel.)
 Spittel, R. L. & Fernando, S. E. 690 (Der.)
 Splatt, B. with Fairley 773 (Z.)
 Spring, D. 764 (Myc.)
 Spyropoulos, N. J., 516 (K.A.)
 Stanhope, R. A. B., 796 (Rab.)
 Stansale, R. 337 340 (Lep.)
 Stathova, N. A. with Gnedina, (558) (Hel.)
 van Steenis, P. B., 28 (Mal.) 689 (Misc.)
 Stefanopoulos G. J. & Homoy, S. 129 (R.F.)
 — G. J., with — 453 (Dys.)
 — with Pettit, 308 (Y.F.)
 — with — & Frasey 307 (Y.F.)
 — with — & Kolochine, 1007 (I.F.)
 Stein, A. A. 1043 (Lep.)
 Stern, A. K., with Pawlowsky 264 (Z.)
 — with — & Periljew 247 (Z.)
 Striner G. & Fischl, V. 653 (R.F.)
 Steinhart, K. 841 (Hel.)
 Starckx, P., 1024 (B.)
 Stephens, J. R. C., 288 (Z.)
 Stephens, J. W. W., 414 (Misc.) 1011 (B.)
 Stern E., (489) (Dys.) 633 (Am.) 832 (Mal.)
 Stern, L. & Rosengolz, H. P. 207 (S.S.)
 Stödel, 190 (S.S.)
 Störmel, R. 1036 (Lep.)
 Stewart, M. A., 818 (Z.)
 Stewart, R. C. 138 (Fav.)
 Stiles, C. W. & Baker C. E. 557 (Hel.)
 — & Haswell, A. 41 (Z.)
 Stitt, E. R. 815 (B.R.)
 Stiven, H. E. S. 690 (Misc.)
 St. John, J. H., 31 (Mal.)
 — with Simmons, (931) (Mal.)
 — & Gardner L. L. 968 (Hel.)
 Stoll, H. F. 967 (Hel.)
 Stovall, W. D. & Greeley H. P. 781 (Myc.)
 Stratman-Thomson, W. K. & Loewenbert, A. S., 198, 199 (S.S.)
 Street, A. 146 (Am.)
 Strickland, C. assisted by Choudhury K. L. & others, 909 (Mal.)
 — with — Dodds-Price J. Forsyth, C. E. P., Smith H. Murphy R. A. & Williams, D. P. 4 (Mal.)
 Ströman, R., with Nasaland, 91 (Pl.)
 Strong, W. M., 112 (Der.)
 Strocin, T. with Dagami, (886) (R.F.)
 Struthers, E. B., 19 (Mal.)
 Stuart, G. & Krikorian, K. S. 223 732 (Rab.)
 Stuart, H. C. & Augustine, D. L. 842 (Hel.)
 Stunkard, H. W. (683) (Lep.)
 — & Willey C. H. 874 (Hel.)
 Sturgis, C. C., with Isaacs & Smith, 840 (Hel.)
 Sudan, 700 (S.S.)
 Salk, N., 622 (Lep.)
 Sur P., 8 (Mal.)
 — with Iyengar 2 (Mal.)
 Surraco, N., with Talice, 668 (R.F.)
 Suzuki, K. 484, 485 (Dys.)
 Suzuki, M., with Matsumura et al, 943 (B.)
 Suzuki, S., 119 (R.F.)
 Suxer, D., 467 (Am.)
 Swenson, R., 227 (Z.)
 Swaminath, C. S. with Shortt, 236 (Z.)
 — with — & Craighead, 310 (K.A.)
 — with — & Smith, 322, 323 (K.A.)
 — with — & d'Silva, 325 (K.A.)
 Sweetney M. A. with Walker 1032 (Lep.)
 Swellingrabel, N. H., with de Bock & Schoute, (824) (Z.) 915 (Mal.)
 — with Dinger Schöfner & Snijders, 1006 (I.F.)
 — with Hontig, 282 (Hist.)
 Sydenstricker E., with Goldberger Wheeler King & others, 356 963 (Pl.)
 Symes, C. B., 243 (Z.)
 Syphantos, S., 455 (Fav.)
 Symms, A. 636 (Pl.)

T

- Tadda, L., with Buceff, (256) (Z.)
 Takahashi, S. 106 (Der.)
 Takaya, J. 220 (Rab.)
 Takoda, S., (185) (489) (Dys.)
 Tahat, A. 317 (K.A.)
 Taliaferro L. G., 800 (Z.)
 Taliaferro W. H. 231 794 802 (Z.), 969 (Mal.)
 — Hoffman, W. A. & Cook, D. H. 334, 535 (Hel.)
 — & Taliaferro, L. G., 27 (Mal.)
 Talaridas, P. P., 1020 (B.)
 Talice, R., 636 (R.F.)
 Talice, R. V., 639 (R.F.)
 — & Mackinnon, J. E., 761 (Myc.)
 — & Serraco N., 663 (R.F.)
 Tamiya, T., 817 (Lep.)
 Tanabe R., 853 (Y & S.)
 Tanabe M. & Chiba, E., 474 (Am.)
 Tanow I. & Haschow G. 933 (Mal.)
 Tanikawa, K. with Matsumura et al, 963 (B.)
 Tapscott J. with Moral, 873 (Am.)
 Tarasow S. I. 673 (R.F.)
 Tate, D. L., 13 (Mal.)
 Taylor A. W. 799 (Z.)
 Taylor E. K., with Sharp, 680 (Der.)
 Taylor J. & Thant, U., 906 (B.)
 Tchernenko A., with Le Boucher Caprina & Lalret, 997 (Y.F.)
 Teyon, G. with Frugoles T. & Williams L. (38) (Mal.)
 Teyro, T., with Masataka (344) (mat. Lep.)
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